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Farm Chemicals

Pioneer Journal of the Industry

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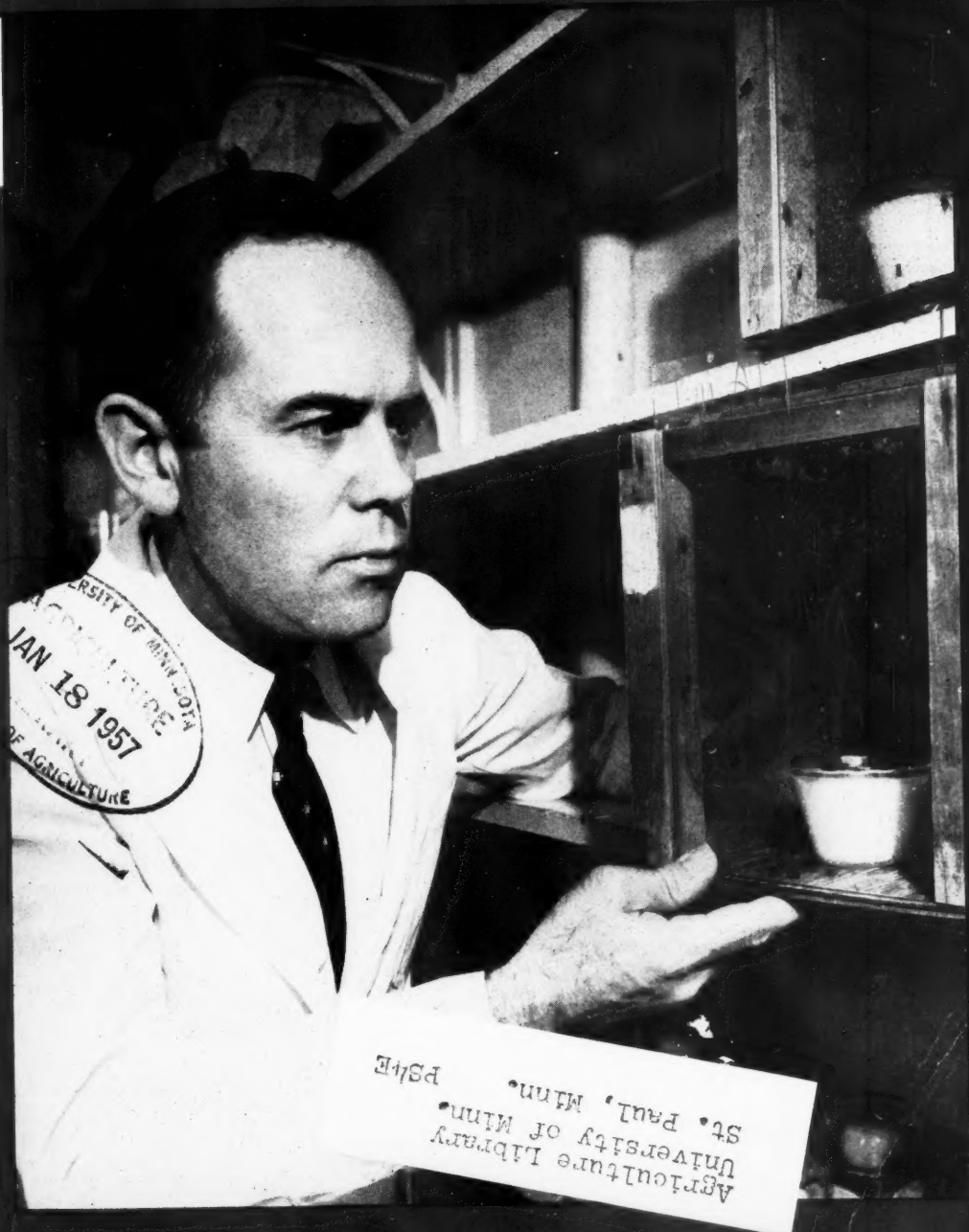

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LOOK TO NATIONAL POTASH FOR QUALITY AND SERVICE

Backed by the skills and experience of its parent companies – Pittsburgh Consolidation Coal Company and Freeport Sulphur Company – NATIONAL POTASH offers important advantages as a dependable source of quality potash.

NATIONAL'S mining operations and refining processes will include the very latest industry techniques, and its storage and shipping facilities have been planned to meet efficiently the demand of the peak fertilizer season.

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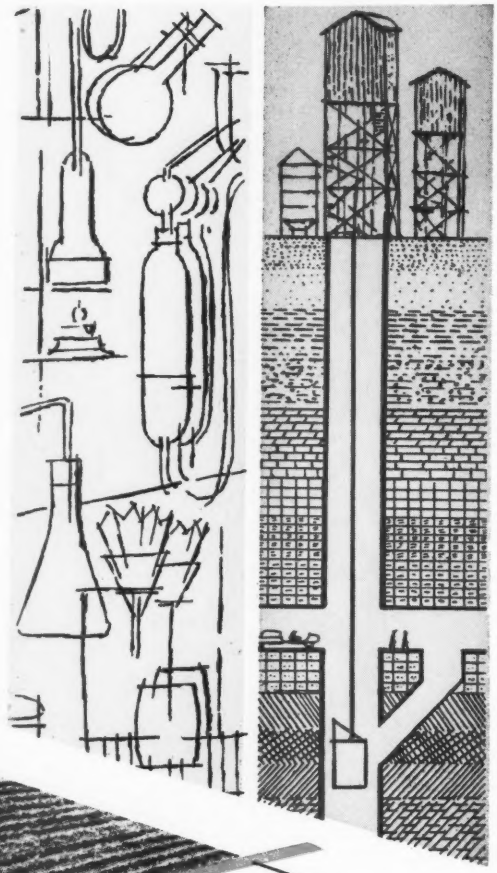

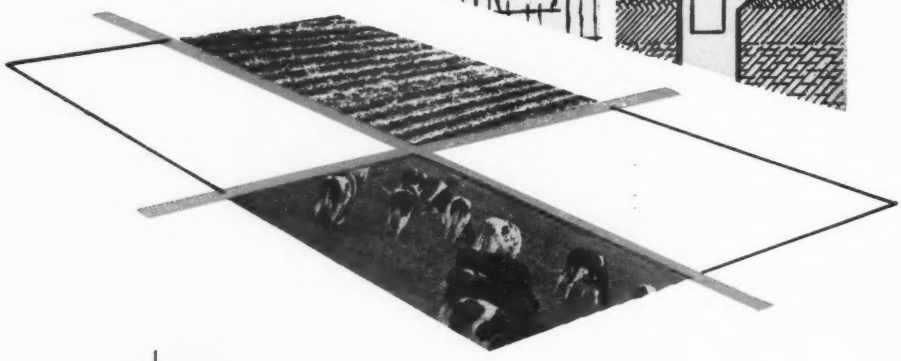

NATIONAL POTASH COMPANY

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5 PHILLIPS

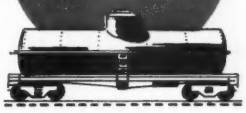
Fertilizer Materials for High Analysis Mixtures

1

AMMONIUM SULFATE

New Premium Quality Phillips *66* Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

2



ANHYDROUS AMMONIA

Phillips *66* Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation of mixed goods. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston.

3

NITROGEN SOLUTIONS

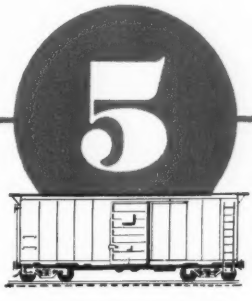
Get more N per dollar! There are three Phillips *66* Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions help to keep manufacturing costs low; help rapid, thorough curing.

4

AMMONIUM NITRATE

Phillips *66* Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills resist caking, handle easily. Depend on Phillips *66* Prilled Ammonium Nitrate for uniform free-flowing properties and top-notch crop response as a direct application material. It's an ideal companion high nitrogen fertilizer for your quality mixed goods.

5



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Phillips *66* Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high-analysis fertilizers.

Phillips 66

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Farm Chemicals

JANUARY, 1957
No. 1
Vol. 120

Pioneer Journal of Farm Chemicals Industry, Est. 1894

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In this issue . . .

Some papers presented at the 48th annual meeting of the American Phytopathological Society, recently held in Cincinnati, are given on page 45. Interesting work with fumigants is reported, on control of root lesion nematode.

To accurately measure and distribute liquid fertilizers, proper metering is essential. On page 46 we present an article which concerns the measurement at mixing sites and the delivery of the fertilizer to the consumer. To give such accurate control an understanding of the liquid plus the measuring materials is required. We believe Paul Mankin provides an excellent presentation on the subject.

On page 50 is an article on amino triazole, its history in controlling various weeds and also the spectrum of plants on which it has been tested. Mention is also made of its very effective control on weedy fallow land. Coverage is given to the aerial application of this chemical for control of weeds.

"The ICC Freight Decision" is the title of the timely article on page 54. Harms discusses the various effects the decision will have on agriculture, with special emphasis on the fertilizer industry and the problems created by the general increase in cost of freight. A comparison of costs of farm supplies in relationship to the cost of fertilizer is presented.

Cover story

This month our cover photo illustrates the testing and evaluation procedure carried out by J. H. Fales of the USDA, in the development of Sesoxane. This is a synergist, recently introduced by Shulton, Inc., and should find application where a safer product is required for use on grains, fruits, and household sprays.

You save money with LION in your fields

LION BRAND AMMONIUM NITRATE IS A LOW-COST SOLID NITROGEN FERTILIZER

FOR LOW-COST NITROGEN, LION is the brand. Lion Ammonium Nitrate is guaranteed to contain 33.5% nitrogen, which means lower-cost nitrogen for your crops . . . more for your money in bigger crop yields.

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MADE BY WORLD'S LARGEST. Lion Brand Ammonium Nitrate is made by Monsanto Chemical Company, world's largest producer of prilled ammonium nitrate—and *your* most reliable source of *low-cost* nitrogen. Save money. Buy *Lion!*

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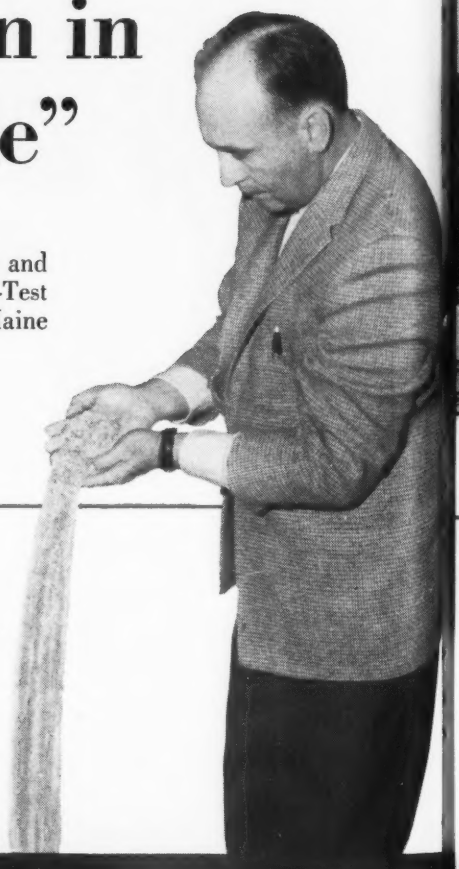
When we checked International's

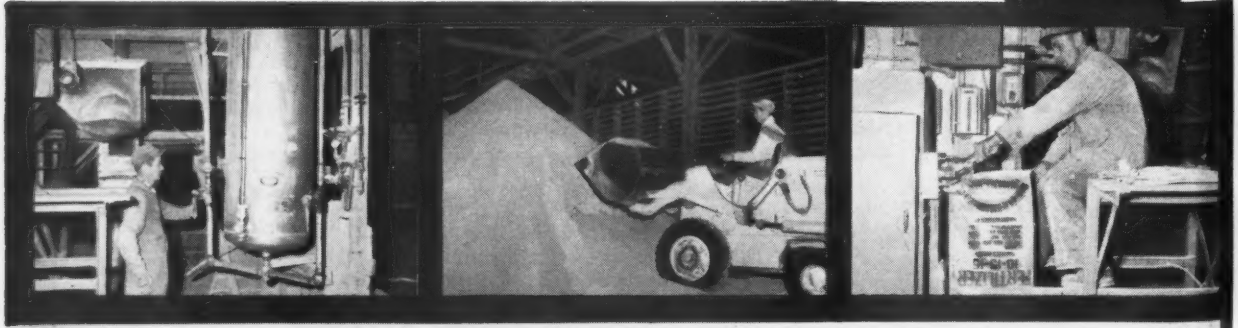
"How to get an extra 212 lbs. of nitrogen solution in each ton of triple"

says Mr. W. R. Edgecomb, Treasurer and General Manager of the Aroostook Hi-Test Fertilizer Company, Presque Isle, Maine



With International's triple we use 666 lbs. of nitrogen solution* per ton, reports Edgecomb. With another triple, our ammoniation rate was only 454 lbs. of solution per ton.

*24.5% free NH_3; 56.0% Ammonium Nitrate; 10.0% Urea; 9.5% H_2O.



A calibrated measuring tank is the heart of Hi-Test's batch ammoniating system. Triple is ammoniated as it is unloaded from rail cars.

Superior ammoniation qualities make International's triple ideal for high analysis fertilizers. Complete ammoniation reduces chance of setting up.

The Hi-Test plant mixes four grades of high analysis fertilizers . . . all sold under the Hi-Test brand name. 80-pound bags are moved by conveyor.

ammoniation rate, we learned

Superior ammoniation qualities are important reasons why Mr. W. R. Edgecomb (left) and Mr. Harry W. Trask, Sales Manager, are satisfied users of International's triple super.

"WE LEARNED by experience. Our ammoniation rate proved that International's triple had the superior ammoniation qualities we were looking for," says W. R. Edgecomb, of the Aroostook Hi-Test Fertilizer Company.

"We ammoniate 1500 pounds of International's triple with 500 pounds of nitrogen solution. This gives us a base of 11.1% nitrogen and 35.2% A.P.A."

Compare these results with the ammoniation rate for the triple they previously used — 370 pounds of solution for each 1630 pounds of triple. It's easy to see why International's triple helps this Presque Isle, Maine, firm hold down formulation costs . . . why they are really sold on International.

From the time they receive the triple at their plant siding . . . this highly efficient fertilizer plant operates to take full advantage of the many savings offered by International.

First of all, water shipments to Searsport, Maine, help hold down the cost of the delivered goods. The triple is then shipped by rail to Presque Isle.

Then Aroostook ammoniates the triple from the track. The triple passes through a batch ammoniating system featuring a calibrated measuring tank.

This ammoniating procedure, says Edgecomb, gives them superior results and reduces the possibility of the ammoniated triple setting up. And in addition it gives the material a more desirable granular texture.

What's more, with International's triple they are able to unload a car of nitrogen solution in 1½ days . . . a saving of a full half day. This in turn helps avoid any extra demurrage charges.

This system enables Hi-Test to handle large shipments of triple during the slack season and save on freight. With four men working, they can ammoniate 90 tons of triple (121 tons of base goods) in a normal working day.

If you have not already tried International's superior product — the triple with a guaranteed constant minimum of 46% A.P.A. — put us to the test. You too will become a satisfied customer.

Write or wire International Minerals & Chemical Corporation for full information on prices, shipping and warehousing arrangements.

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Business & Management

. . . News of the Industry

Benson Opposes RR Freight Rate Increase

Testimony in opposition to a proposed 7 per cent increase in railroad freight rates, to the extent that such an increase would apply to farm supplies and farm commodities, was given recently by Don Paarlberg, assistant to Agriculture Secretary Ezra Taft Benson, at an Interstate Commerce Commission hearing in Kansas City, Mo. Dr. Paarlberg testified for Secretary Benson.

Exhibits of the behavior of farm prices and trend of farmers' income during the last ten years, and of the economic condition of agriculture in relation to the nation's total economy were included in the testimony.

ICC was urged to give top priority to the alleviation of the depressed economic condition of agriculture in its consideration of the railroads' request for higher freight rates.

Reorganize Semo

Semo Liquid Fertilizer Corp., Charleston, Mo., has been reported reorganized, under the leadership of John Wilson in cooperation with several cotton ginning firms in that area.

The company's manufacturing facilities have been redesigned and equipped by Ellsworth Equipment & Engineering Co.

Fairfield Moves

Sales headquarters of Fairfield Chemical Div., Food Machinery & Chemical Corp., have been moved to 441 Lexington Ave., Room 408, New York City 17. Phone No.: Oxford 7-1940.

PYR Travels By Air

The blocked Suez Canal isn't stopping shipment of African pyrethrum. Photo shows arrival at International Airport, New York, of the first trans-Atlantic flight of PYR extract, flown from the Chimiphar plant at Bukavu, Belgian Congo.

Stauffer Display Wins 1st Prize

Stauffer Chemical Co., Tampa, Fla., won first prize for the most outstanding exhibit in the allied trades category at the 1956 Trade Show of the Florida Nurserymen and Growers Assn.

Held at Sarasota, Fla., this year, the show is presented annually to permit the several hundred members of the association to get together for a program of entertainment, education, and exchange of ideas and merchandise.

One afternoon during the three-day show is set aside for attendance by the public. This year more than 1,600 visitors paid to see the exhibits.

There were about 100 commercial displays by fertilizer, chemical, equipment and other related manufacturers. A total of $1,000 was given in prizes for the most outstanding exhibits.

In addition to Stauffer, other farm chemicals displayers included Wilson & Toomer, Swift & Co., Shell Chemical Corp. and Garden Supply Sales Co.

Stauffer took first prize in the allied trade exhibits at the show.

Chatelier Plant Food Co. used this attractive array of their products.

Scottish Visitors Tour US Fert. Plants

Two visitors from Scottish Agricultural Industries Ltd. recently toured the Davison Chemical Co. plant at Wakarusa. After presenting a report on new agricultural processes at the Fertilizer Industry Round Table in Washington, D. C., Edmund Hudson and John Crozier, executive vice president and sales vice president, respectively, of the Scottish firm, toured fertilizer plants in this country before returning home.

THE MAN WITH THE ★ MULTIWALL PLAN

UNION PACKAGING SPECIALIST DON DEININGER

saves Multiwall user $8 per M through specifications review

A Chemical Company, already using 43 different sizes and types of Multiwalls, planned to add new products to its line. Union Packaging Specialist Don Deininger recommended a simplification of Multiwall specifications and inventory. Union prepared a Specifications Manual for the manufacturer, also simplified, unified and modernized his bag designs.

Results: user reported: (1) Union's recommendations for re-designing bag sizes and constructions in some instances saved as much as $8 per M.

(2) The new Specifications book enabled the customer to order bags more easily and accurately. It also simplified his inventory control.

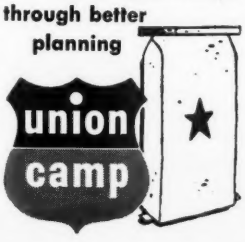
(3) The new designs established a visual relationship between his family of products, enabled his sales force to do a better merchandising job.

This is a typical example of Union's 5-Point Multiwall Plan in action. Perhaps it can produce gains in your own Multiwall packaging operation. Write for additional information.

Union Multiwall Recommendations are based on this 5-point Packaging Efficiency Plan

- DESIGN
- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

Better Multiwall performance through better planning



UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

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*Trade Mark

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Agronomists—Industry To Meet in Chicago

Proper fertilizer placement in profitable crop production will receive special attention at the forthcoming annual joint meeting of Midwestern agronomists and fertilizer industry men at the Edgewater Beach Hotel, Chicago, on February 14 and 15.

Sponsored by the Middle West Soil Improvement Committee, the meeting will have as its chairman Dr. Kermit C. Berger, University of Wisconsin.

On the program for the 14th will be reports on fertilizer research by college agronomists.

Reports, discussions and a question and answer session on Proper Placement of Fertilizer in the Row for Corn will be heard the morning of the 15th. Among the speakers are Dr. A. J. Ohlrogge, Purdue University; W. H. Garman, National Plant Food Institute; W. C. Hulburt, USDA; and Z. H. Beers, executive secretary of MWSIC.

Recommendations by agronomists for fertilizer grades and ratios for 1957 in the various Midwestern states will be presented by Dr. Berger.

Beers urges fertilizer industry men and agronomists to make immediate arrangements for room reservations at the Edgewater Beach hotel.

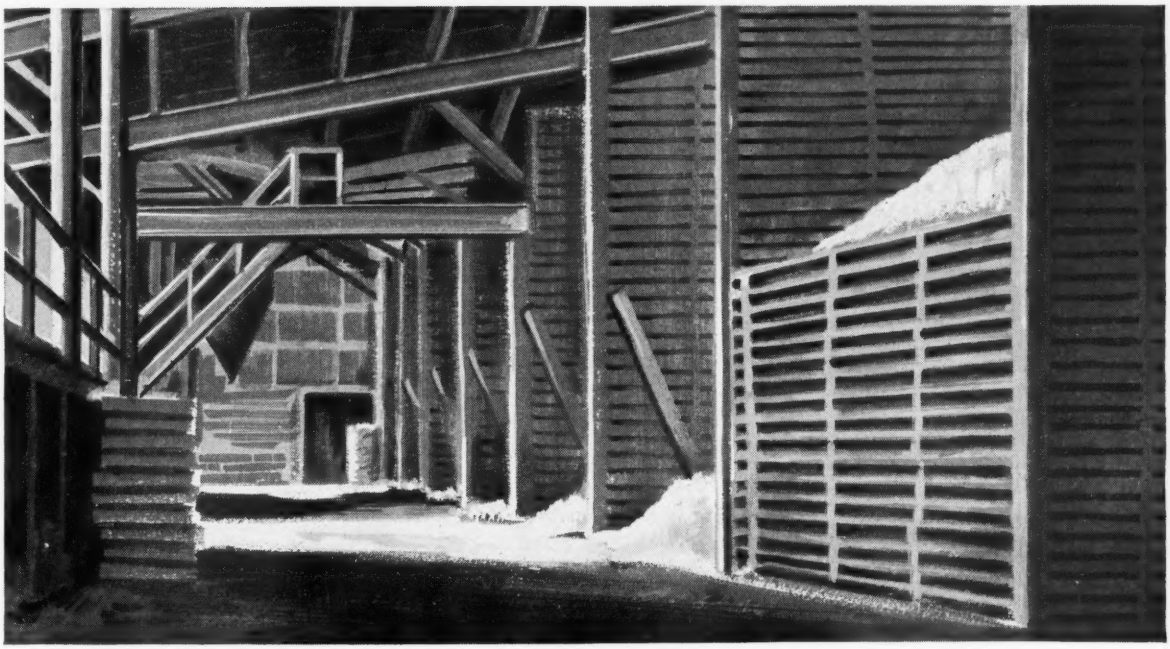
Correction

In a news item appearing on page 13, September 1956 issue, it was incorrectly stated that Richlawn Fertilizer, a product of Richlawn of Fort Worth, Inc., contains dieldrin. When in concentrated form, the plant food does not contain insecticide. Dieldrin and/or malathion may be mixed with the water which is used to dilute Richlawn Fertilizers in the spray applicator tank.

Make sure it stores till spring

This time of the year, when you're busy moving inventory to warehouses or dealers, ask yourself this question:

"Have I done everything possible to make sure my mixed goods will store until spring?"



Consider ammoniation solutions. The type you use can improve the condition of your product and its storing qualities. Curing can be improved and bag set eliminated by your choice of solution.

Here's where the *complete* line of Sohiogen solutions can help with its wide choice of characteristics for better manufacturing control . . . plus special solutions with the condition-improving benefits of urea nitrogen.

The man from Sohio is trained to help you select the exact solution to best fit your needs. And Sohio's technical services are available whenever you need them.

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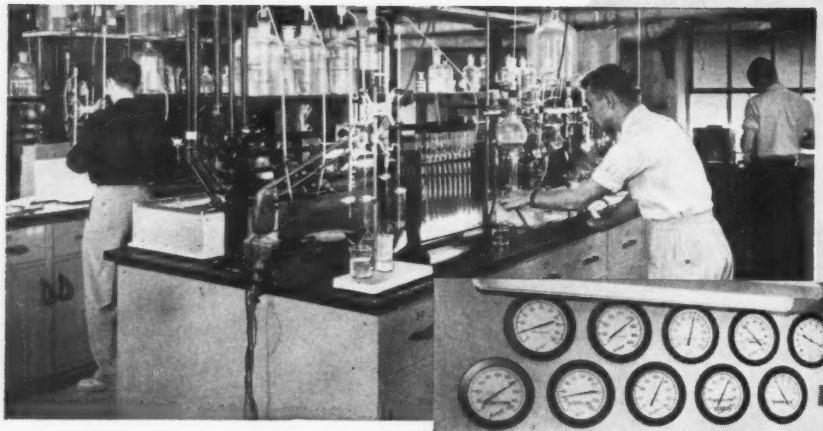

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Fine Texture, Small Particle Size For Maximum Ammoniation-Granulation

Our thirty years' background of producing Triple Superphosphate gives us a know-how that is surpassed by none. Through our constant research program and our close relations with the fertilizer industry, we have maintained over the years, an exacting chemical and physical control program to insure that only the highest quality Triple Superphosphate will bear our label.

From the raw materials to the finished product, step-by-step in each process, rigid quality control is maintained to deliver to you a Triple Superphosphate of fine texture, small particle size, 46% available P_2O_5, natural air cured, pre-shipping conditioned, ready for immediate inclusion into your processing.

There's a **BRADLEY & BAKER** office near you. Their representative would be pleased to consult with you on your requirements and to advise on your most convenient delivery routings.

RIGID QUALITY CONTROL

Through Six Basic Chemical and Physical Analysis

HIGH WATER SOLUBILITY

High Water Solubility is a Characteristic of all 3 Grades

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Fine Texture, Highest Porosity, Large Surface Area, Small Particle Size, for Maximum Ammoniation-Granulation.

GRANULAR

Dust Free, Free Flowing, Uniform Particle Size, Medium Hardness, No Bridging Over, for Direct Soil Application.

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For Intermediate Ammoniation to Produce a Semi-Granular Product. Also Affords Excellent Compatable Mixing with Granular Potash, for Minimum Segregation, in Alkaline Grades.

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Use

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TRIPLE

Superphosphate

State Agricultural Experiment Stations and other authoritative sources are recommending fertilizers with ever increasing plant food units per ton. High analysis fertilizers are in demand because they give more for each fertilizer dollar. Meet this demand by incorporating Davison's New Triple Superphosphate in your formulation.

Davison's Triple Superphosphate has 45/46% available P_2O_5 and is supplied in the easy-to-use granulated form or run-of-pile.

Order Davison's Triple Superphosphate. For complete information, call or write.

Progress Through Chemistry

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PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, TRIPLE SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS AND SILICOFLUORIDES. SOLE PRODUCERS OF DAVCO® GRANULATED FERTILIZERS.

THIS ADVERTISEMENT sells new Hi-D Ammonium Nitrate Fertilizer. It appears in February issues of *Capper's Farmer, The Progressive Farmer, Prairie Farmer, Farm & Ranch,* and *Florida Grower and Rancher.*

Farmers asked Question after Question about HI-D Ammonium Nitrate

Read the kind of down-to-earth questions that many farmers fired at us and you'll see why they decided to make Hi-D Ammonium Nitrate their first choice as a supplemental Nitrogen Source.

Q. What's this "Hi-D" and what's so new about it?

A. Hi-D stands for high density. Hi-D Ammonium Nitrate is a hard, dry fertilizer that's made by an exclusive, patented process. It's a denser product with the maximum moisture "squeezed" out of it before the granule is formed. There isn't another form of ammonium nitrate like it!

Q. What about storage?

A. Commercial Solvents Corporation guarantees that Hi-D Ammonium Nitrate will store well under normal conditions for one full year. And, by the way, that brings up another advantage of Hi-D. Being a denser, more compact material, it has less bulk, takes up less room in storage. 10 bags stack in the same space as 8 bags of other types of ammonium nitrate. That means you can get up to 25% more nitrogen in a normal hopper load.

Q. Well, how does this denser material perform in the spreader?

A. High density means a drier ammonium nitrate. And that means that Hi-D doesn't gum up, doesn't stick, clog, cake or bridge, even on soggy, steamy days.

Q. How does it spread? Hi-D looks different.

A. You're right, Hi-D *is* different. Note the controlled size and unique shape that assure smooth, even distribution in all types of spreading equipment under all field conditions. The beauty of it is that it really flows freely, spreads evenly and stays put!

Q. Doesn't this same high density make for slower action in the soil?

A. Absolutely not. Hi-D dissolves readily in soil moisture, goes to work fast. But as you probably know, Hi-D Ammonium Nitrate gives Two-Step Action. The guaranteed 33.5% N comes in two balanced "servings". You get 16.75% nitrate nitrogen that goes to work immediately for fast, vigorous starts, and 16.75% ammonia nitrogen for sustaining follow-up feeding. Interesting thing about Hi-D, it contains the kind of nitrogen in sodium nitrate *and* the kind in ammonium sulphate as well.

Q. It ought to be better than sodium nitrate and ammonium sulphate — it costs more per bag. What do you say about that?

A. No, no, it costs less! Sure, bag for bag it costs more, but you forget you're not buying bags, you're buying *N*. 100 pounds of Hi-D gives you as much nitrogen as 159 pounds of ammonium sulphate, gives you as much nitrogen as 209 pounds of sodium nitrate. Putting it another way, for 100 pounds of straight N you need over 600 pounds of soda, nearly 500 pounds of sulphate, *but only 298 pounds of Hi-D.*

Q. They say that ammonium nitrate is acid forming. Is Hi-D?

A. Acid forming is just another way of saying that growing crops remove calcium from the soil. Hi-D helps make big crops which take out more calcium than small crops. Of course, some products do include lime but it's an expensive way to get insufficient limestone. As you know, the lime in such products is only enough to neutralize the fertilizer. It's not sufficient to meet the important requirements of a sound, integrated liming program.

Q. Where does Hi-D fit in my fertilizer program?

A. Good question! It gives us a chance to stress mixed fertilizers. We don't sell mixed goods but we can't overemphasize their importance. Hi-D is not a substitute for mixed fertilizers. It's a supplement. Many crops take more nitrogen from the soil than can be put back readily in mixed fertilizers. The role of supplemental nitrogen is to satisfy this additional need. In many cases supplemental nitrogen is the lowest-cost way to get maximum profits. Hi-D Ammonium Nitrate is only one part of your program for lowering crop unit costs. You know better than we do that income goes down unless production per acre goes up. Fertile land is profitable land. Land fertility calls for soil testing, a liming program, the mixed fertilizer your dealer recommends — then, and only then, Hi-D Ammonium Nitrate as needed.

SEE YOUR DEALER. *Ask your dealer for a sample of this new high density material. Look for the GREEN & WHITE BAG. Put Hi-D to work this season. Test it side by side with any other nitrogen fertilizer you want to — on any crop, under any condition. You can trust Hi-D to do the job in the field and in the yield.*

Go In And See New HI-D!

ASK FOR A SAMPLE

CSC

a product of

COMMERCIAL SOLVENTS CORPORATION

7890 Folk Ave., St. Louis, Mo. and Terre Haute, Ind.
344 Williams St. N. W., Atlanta, Ga. and Sterlington, La.

CSC Also Produces BACIFERM® Bacitracin Antibiotic Supplements, and PEAK® Anti-freeze

New Fla. Offices for Davison

Construction has been started in Ridgewood, Fla., of a new office building for the Florida Phosphate Div., Davison Chemical Co. Div. of W. R. Grace & Co.

Designed and equipped to house all administrative, office and engineering personnel, 65 people, the structure will be about 170 feet long and 70 feet wide, with 10,500 square feet of floor space. The building will supersede four dwellings which have been adapted for office purposes and currently house the office force of the firm.

Wellman Construction & Engineering Co., of Lakeland, drew plans for the building and are in charge of construction, which is scheduled for completion by March, 1957.

4-H Entomology Awards Announced

Hercules Powder Co. has announced the six winners of the fifth National 4-H Entomology Awards—Sally Pullar, Thomaston, Conn.; James C. Fry, Clinton, Ill.; Kenneth Boutwell, Jr., Newton, Miss.; Sue Goforth, Olin, N. C.; John F. Reinert, Fairmont, Okla. and Gerald Beierle, Torrington, Wyo.

Forty-five states were entered in the Entomology Awards Program this year. In addition to awards for national and state winners, county winners received gold-filled medals. Hercules officials present at the supper honoring winners included Paul Mayfield; vice president, M. R. Budd, director of advertising; and P. J. Reno, manager, Agricultural Chemicals Division, Naval Stores Dept.

Vitro Corp. Acquires Berkshire Chemicals

According to J. Carlton Ward, Jr., president, Vitro Corp. of America, Berkshire Chemicals, Inc. has agreed to become a wholly-owned Vitro subsidiary on an exchange of stock. The new subsidiary, it is anticipated, will not undergo any changes in personnel.

In addition to its own chemical sales, the newly formed subsidiary will handle sales of two other Vitro divisions, Vitro Manufacturing Co. and Vitro Rare Metals. At present, Berkshire has five offices: New York, Boston, Chicago, Cleveland and Philadelphia.

Incorporations

Paragon Humus Peat Co., Inc., fertilizers, c/o Leon, Weill & Mahony, 9 East 40th St., New York City 16, has been granted charter of incorporation listing capital stock of 200 shares, no par value. Directors are Mary Lamm, Rose Lanzolla and Gertrude Weissberg, all of 9 East 40th St., NYC.

T. A. Quinn Chemical & Fertilizer Co. has been granted a charter at Yazoo City, Miss., listing capital stock of $25,000.

Sangamon Grace Ammonia Co., Chicago, Ill., has been granted Mississippi permit (charter) to deal in fertilizers, insecticides, fungicides and other farm chemicals.

New Ammonia Plant Slated for Cal.

A new source of agricultural ammonia, at Huron, is due for California's San Joaquin Valley, according to Ammonia Chemical Corp. Upon completion, the plant will be capable of producing 100 tons a day.

Cost has been estimated to be $5 million and the plant will use pipe line natural gas. Monterey Oil of Los Angeles is said to be interested in making the project a joint venture, in which case Ammonia Chemical would be the operator.

IMC Moves to Larger NY Quarters

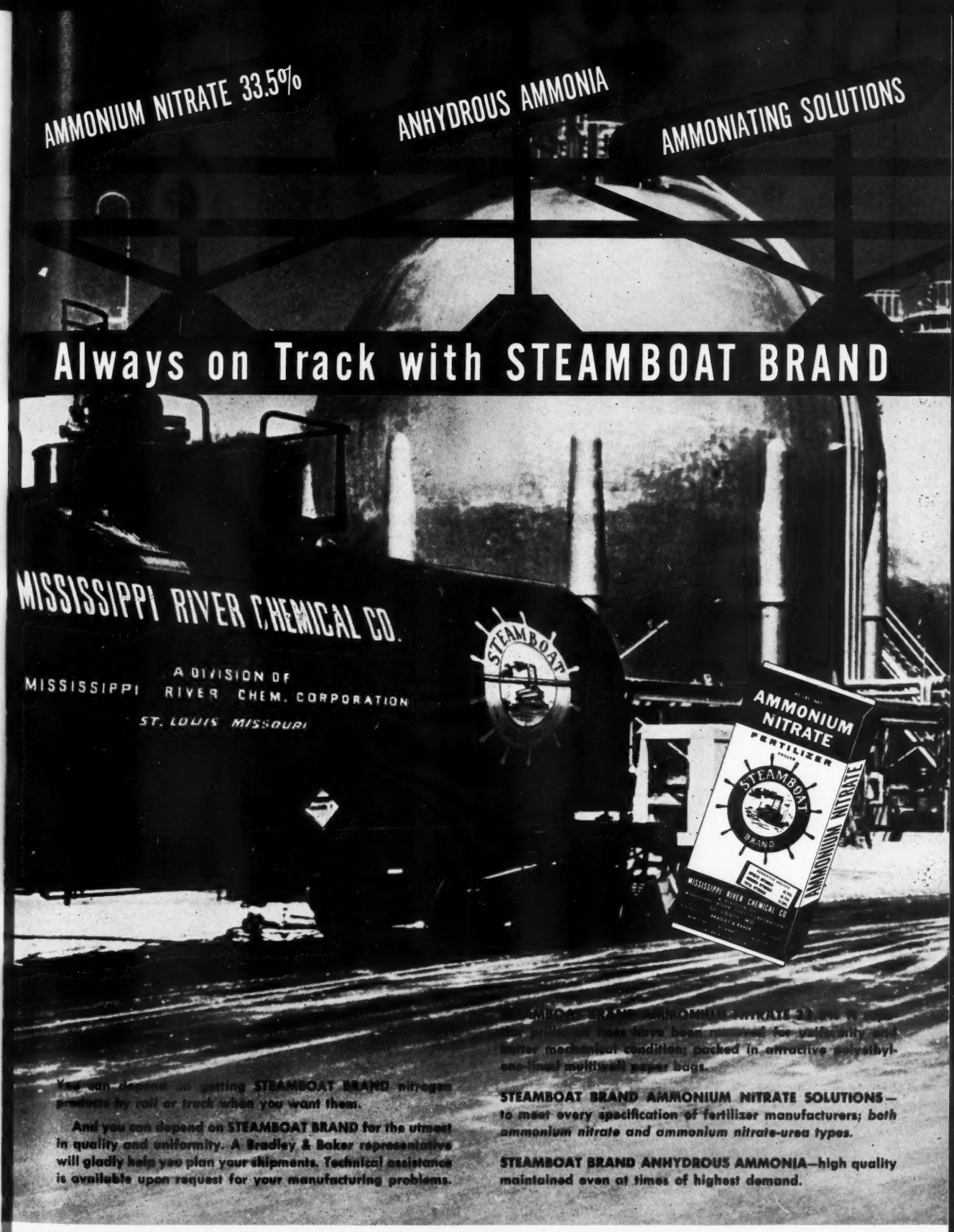
As part of an over-all expansion program, the New York offices of International Minerals & Chemical Corp. were moved last month to larger quarters in the new building at 485 Lexington Ave. The firm has leased the 27th floor.

International also has announced plans to transfer its national headquarters from Chicago in 1958 to greatly enlarged offices and research facilities now being constructed in the Chicago suburb of Skokie.

Howell Files $435,000 Suit Against V-C

Joseph Howell, former president of Virginia-Carolina Chemical Corp., is reported to have filed a $435,000 legal suit in law and equity court at Richmond, Va., against the V-C firm.

V-C, claims Howell, has not followed terms of a 10-year contract, approved by stockholders, which still has several years to run.


AMMONIUM NITRATE 33.5%
ANHYDROUS AMMONIA
AMMONIATING SOLUTIONS
Always on Track with STEAMBOAT BRAND
MISSISSIPPI RIVER CHEMICAL CO.
MISSISSIPPI A DIVISION OF RIVER CHEM. CORPORATION
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STEAMBOAT
BRAND
AMMONIUM NITRATE
MISSISSIPPI RIVER CHEMICAL CO
You can depend on getting STEAMBOAT BRAND nitrogen products by rail or truck when you want them.
And you can depend on STEAMBOAT BRAND for the utmost in quality and uniformity. A Bradley & Baker representative will gladly help you plan your shipments. Technical assistance is available upon request for your manufacturing problems.
STEAMBOAT BRAND AMMONIUM NITRATE 33.5% N
fertilizer lines have been screened for uniformity and better mechanical condition; packed in attractive polyethylene-lined moisture-proof paper bags.
STEAMBOAT BRAND AMMONIUM NITRATE SOLUTIONS—to meet every specification of fertilizer manufacturers; both ammonium nitrate and ammonium nitrate-urea types.
STEAMBOAT BRAND ANHYDROUS AMMONIA—high quality maintained even at times of highest demand.

MISSISSIPPI RIVER CHEMICAL COMPANY

A Division of Mississippi River Fuel Corp., St. Louis, Mo.

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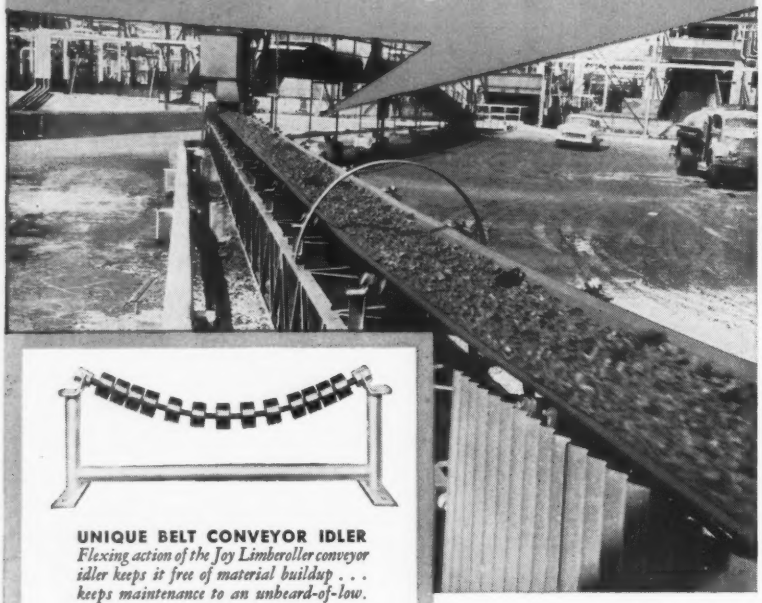
District Sales Offices: ATLANTA • INDIANAPOLIS • ST. LOUIS • NORFOLK • HOUSTON

Handle Sticky Materials Without Buildup on Rolls!



UNIQUE BELT CONVEYOR IDLER
Flexing action of the Joy Limberoller conveyor idler keeps it free of material buildup . . . keeps maintenance to an unheard-of-low.

Belt conveyor maintenance can be a real headache when sticky chemicals and fertilizers start gumming up the idlers. The unique Limberoller belt conveyor idler is completely flexible—made of resilient molded neoprene discs on a flexible steel cable. This flexing action breaks loose any material building up on the rolls—makes maintenance dive 30% to 90%.

The Limberoller has already given over *12 times the service life* of conventional idlers in many applications—proved extremely effective in handling triple superphosphate, ammonium sulphate, and sticky fertilizers.

The Joy Limberoller also resists dust, abrasion, and corrosion . . . no bearing trouble because only two bearings are used and these are up out of the dirt zone. Get details from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Co. (Canada) Limited, Galt, Ontario.*

Write for FREE Bulletin 131-77

Consult a Joy Engineer

For Air and Gas Compressors, Vacuum Pumps and Boosters, Conveyors, Fans, Electrical Connectors, Oil-Free Compressors.

WSW 1-6319-131

JOY

SINCE 1851 . . . OVER 100 YEARS OF ENGINEERING LEADERSHIP

N Div Awards 4-H'ers

National winners of 4-H Field Crops Awards for 1956 with Hugo Riemer of Nitrogen Div., which provided the winners $300 scholarships. Standing: Otis Young, Jr., Milton McDaniel, Riemer, John Lancaster & H. Topper. Kneeling: Joe Peine, Ken McEachern.

Ala. Fertilizer Co. Assets, Stock Bought

Capital stock and assets of Alabama Fertilizer Co. recently were purchased from the estate of John R. Hudson by Menza L. Head, vice president and manager of the firm from 1925 through 1949.

V-C Outdoor Ads

Virginia-Carolina Chemical Corp. will use the theme "The Best Grade Precision-Made for Your Crop" in all fertilizer advertising, outdoor as well as in farm magazines, radio, newspapers and direct mail, reports Outdoor Adv., Inc. In the outdoor medium, the firm plans a 24-sheet poster campaign in Midwestern and Southern farming areas. Albert Sidney Noble Adv. handles the account.

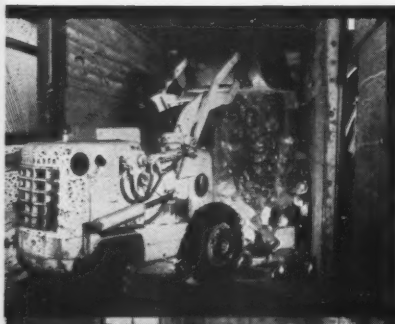
POTASH RAISES FARM INCOME. The successful American orange grower. He's not shy about his success. He'll tell you the importance of frost prevention and the newest insect sprays. He'll probably talk well-balanced fertilizers and potash content, too. And he's the one to talk—grows the biggest, juiciest oranges around! His land isn't better than anyone else's. He treats it better, that's all.

USP's high-grade muriate of potash is free-flowing and non-caking and has the highest K_2O content—62/63% K_2O. Also available, USP's granular muriate of potash contains a minimum of 60% K_2O.

UNITED STATES POTASH COMPANY
DIVISION OF UNITED STATES BORAX & CHEMICAL CORPORATION
30 Rockefeller Plaza, New York 20, New York. Southern Sales Office: Rhodes-Haverty Building, Atlanta, Georgia.

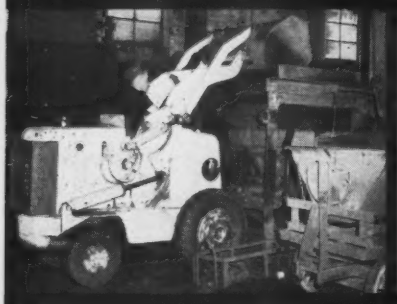
SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.
REG. U. S. PAT. OFF.

Better Engineered for



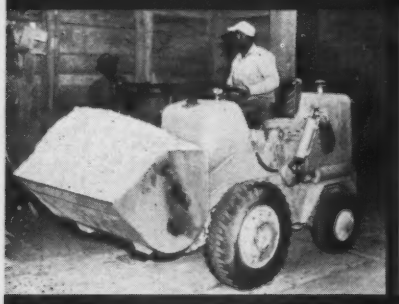
Shortest Turning Radius

The model HA can work where others can't because it has a shorter turning radius than any comparable tractor-shovel — can go through narrow doorways and between spaces less than 4½ feet wide. With a turning radius of only 6 feet 3½ inches it easily turns corners of 6 foot aisles.



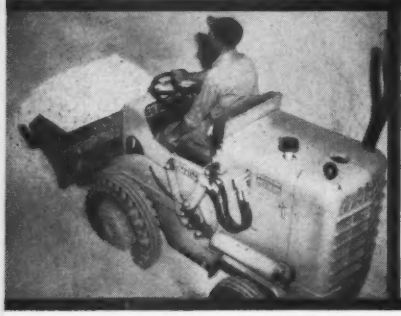
Higher Dumping Height

This "PAYLOADER" can deliver its loads over bin or hopper edges up to 6½ feet high. The bucket in maximum dump position can clear heights of 5 feet 2½ inches with a forward reach of more than 2 feet beyond front of machine. Loads can be dumped as fast as or slow as desired, and at any height.



Biggest Capacity (18 cu. ft. payload)

With a bucket capacity of 18 cu. ft. payload and 14 cu. ft. struck the model HA has a carrying capacity up to 25% greater than all comparative machines and even more than some bigger, heavier machines. Better engineering including the exclusive 40° bucket tip-back action are the reasons the model HA handles more tons per load and more loads per hour.



Easiest Operating

The entire hydraulic control of the model HA bucket — tip-back, raise, dump, lower — is handled by a single conveniently located lever. It's the simplest, easiest bucket control available. Smooth hydraulic brakes, full anti-friction steering mechanism and torque-converter drive makes the model HA easy to operate at high output rates the full shift.

Processing and manufacturing plants of all kinds report that the new model "PAYLOADER" tractor-shovels are not only a great improvement over earlier models but are also way ahead of other front-end loaders in design and productivity — can handle more tons of material per hour than heavier machines with larger engines. The exclusive 40 degree break-out and tip-back of the bucket at ground level gets and holds big loads close and low without spilling. Hydraulic load-shock-absorber smooths the ride and permits higher travel speeds. The low-mounted boom arm design makes operation faster, safer and easier because driver cannot get caught in mechanism and his line of vision is clear. Greater versatility is another valuable feature for many owners who use the floor-sweeper, fork lift, pusher forks and other available attachments that help make the model HA one of the most profitable machines any plant can own.

Unequaled Production

Owners *expect* more from a "PAYLOADER" and they *get* more because more "PAYLOADER" units have been built and are in service than all other wheeled tractor-shovels combined. Your "PAYLOADER" Distributor is ready to demonstrate a model HA, or a larger model from the complete "PAYLOADER" line.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
704 Sunnyside Ave., Libertyville, Ill.

Send data on "PAYLOADER" tractor-shovels

- ☐ Model HA (1⅛ cu. ft.) and HAH (1 cu. yd.)
- ☐ Larger models up to 2¼ cu. yd.

Name _____

Title _____

Company _____

Street _____

City _____

State _____

19

JOHN DEERE VITREA — 45% NITROGEN

Be sure of fastest service and top quality urea nitrogen when you order field proven John Deere **VITREA.** A hard-hitting "farm geared" advertising program is helping to pave the way to bigger **VITREA** sales for you.

JOHN DEERE UREA-AMMONIA SOLUTIONS

Let a qualified John Deere technical representative show you how to save money and at the same time improve the physical condition of your fertilizer by using John Deere urea-ammonia solutions . . . **AVAILABLE NOW!**

JOHN DEERE ANHYDROUS AMMONIA

Get prompt delivery by ordering John Deere Ammonia this year.

Write, wire or phone today . . .

JOHN DEERE

Grand River Chemical Division of
DEERE • COMPANY

PRYOR, OKLAHOMA • PHONE 4000

Pesticide Stocks Greater Than '55

USDA reports that pesticide stocks are well above levels a year ago as of September 30, 1956. Producers stocks of chlorinated chemicals were up 90 per cent, while formulators' stocks rose 20 per cent. Technical and mixed DDT stocks were up 78 per cent as contrasted with a formulators rise of 46 per cent. Calcium arsenate stocks reflected a decrease of 14 per cent from the previous year. This indicates a revival of interest in the product where insect resistance to organic chemicals has developed.

Dow Chem. Sponsors Red Foley Show

Howard Sheldon of Dow discusses plans for the Red Foley show series with the star of the show.

Farm chemicals and penta wood preservative will be promoted on a new radio program, The Red Foley Show, under sponsorship of The Dow Chemical Co., according to Howard Sheldon of Dow's agricultural chemical merchandising section. The half-hour show will be heard each Saturday at 12:30 p.m. (CST) over the ABC network.

Eliminating Corrosion

Fertilizer hoppers made of plastic and reinforced with fiber glass may eliminate the corrosion problem, according to preliminary tests at Oklahoma A & M College at Stillwater. Further observations are necessary to get more reliable evidence.

GRAFLOW means . . .

- reduced caking
- lower curing temperatures
- better flowability
- reduced wear and corrosion
- improved drillability

NEW . . .

GRAFLOW (Trade Mark)

FERTILIZER CONDITIONING AGENT

Here is the new conditioner that can give any pulverized or granular fertilizer a number of advantages. First, in your own plant, GRAFLOW will reduce corrosion of your handling equipment, because it is chemically inert. It will mix and coat evenly because it is basically high quality graphite . . . one of nature's finest lubricants. In addition, GRAFLOW has high coating power. The inert graphitic film isolates fertilizer particles from one another, lowering inter-granular friction. Thus, you benefit two ways with GRAFLOW: your own plant handling is aided, and your product gains greater acceptance. This is a new product, well worth an inquiry for details . . .

* write our Chemical Development Department for complete information.

222

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

PEOPLE

American Agr. Chem. Co. Donald L. LeCureux is new assistant manager of the Saginaw, Mich., sales office.

American Potash & Chem. Corp. Benjamin M. Holt has been named to the newly-created post of project director, Planning & Development Dept.

The firm's Eastern Sales Dept. has been realigned into two operating groups—Heavy Chemicals Div. and Industrial Chemicals Div. General sales managers of the two divisions are Ed M. Kolb and Dr. Al J. Dirksen, respectively.

Kolb

Dirksen

William M. Clines, formerly western sales manager, was named general sales manager, western, to handle all company sales in the western area.

Diamond Alkali Co. Thorton F. Holder succeeds Dr. Albert W. Meyer as director of research. He continues to be responsible for patent and trademark activities and supervision of general purpose research facilities and operations.

CHLORINATED PRODUCTS DIV. Herman E. Meadows and George F. Ham have been named to the technical service staff.

Dow Chemical Co. Dr. Edgar C. Britton has retired as director of the firm's Edgar C. Britton Organic Research Laboratory at Midland but will continue as a research consultant for the firm. He is succeeded as laboratory director by Dr. Ralph P. Perkins, formerly an assistant director.

Escambia Chemical Corp. Robert G. Reed becomes manager for the Research Div., responsible for business functions and the non-technical administration of Escambia's Research Dept.

Food Machinery & Chemical Corp., ORGANIC CHEMICALS DIV. New manager of engineering development is Leonard Seglin, former supervisor of process engineering for the combined FMC Chemical Divisions group.

Seglin

CHEMICAL DIVISIONS. Robert J. DeLargey, resident manager of the Westvaco Chlor-Alkali plant at South Charleston, W. Va., has been promoted to director of engineering for FMC's Chemical Divisions. Neil C. Elphick, general superintendent, will be new resident manager at the plant succeeding DeLargey.

Grand River Chemical Div., Deere & Co. Appointments of C. Frank Walter, J. B. Copeland and Doyle Smith as sales representatives recently were announced.

Walter

Walter will cover Illinois and Indiana; Cope-

Copeland

Smith

land, New Mexico, Arizona, Western Texas and Southern Colorado; and Smith, the Texas Gulf Coast area and Rio Grande area.

Jackson Fertilizer Co. The board of directors has chosen H. B. Green as president. A. A. Green, with the firm 45 years, has been named active chairman of the board.

Michigan Chemical Corp. Everett E. Klicker has been named sales manager in the Rare Earths and Thorium Div.

Naugatuck Chem. Div., U. S. Rubber Co. Walter J. Geldard is appointed marketing coordinator for the division.

Potash Co. of America. Robert B. Lenhart has been named sales representative for the Northeastern and Canadian territory. Lenhart had been with Cooperative G.L.F.

Lenhart

O. M. Scott & Sons. Election of C. B. Mills as chairman of the board and P. C. Williams as president and treasurer recently was announced.

U. S. Industrial Chemicals Co. New manager of alcohol and chemical sales is Warren E. Johnson.

Velsicol Chemical Corp. Billy R. Judkins has joined the firm's AgriculturalChemicals sales staff, to assist area manager Larry Bewick in Mississippi, Louisiana, Arkansas and Tennessee.

Judkins

African Pyrethrum

It's a fact Insects are not resistant to Pyrethrum

PYRETHRUM, harmless to human and animal life, is

Unsurpassed in Quick Knock-Down

Economy in Concentration With Synergists

Rapid Dispersal High Penetration

PYRETHRUM offers highest protection for

Tobacco Storage

Home Aerosols and Sprays

Poultry Houses

Food-Meat Packers

Ship's Holds

Granaries and Flour Mills

TO: AFRICAN PYRETHRUM DEVELOPMENT, INC. 7
65 Pine Street, New York 5, N.Y.

Please send me___copies of free booklet, Pyrethrum Facts.

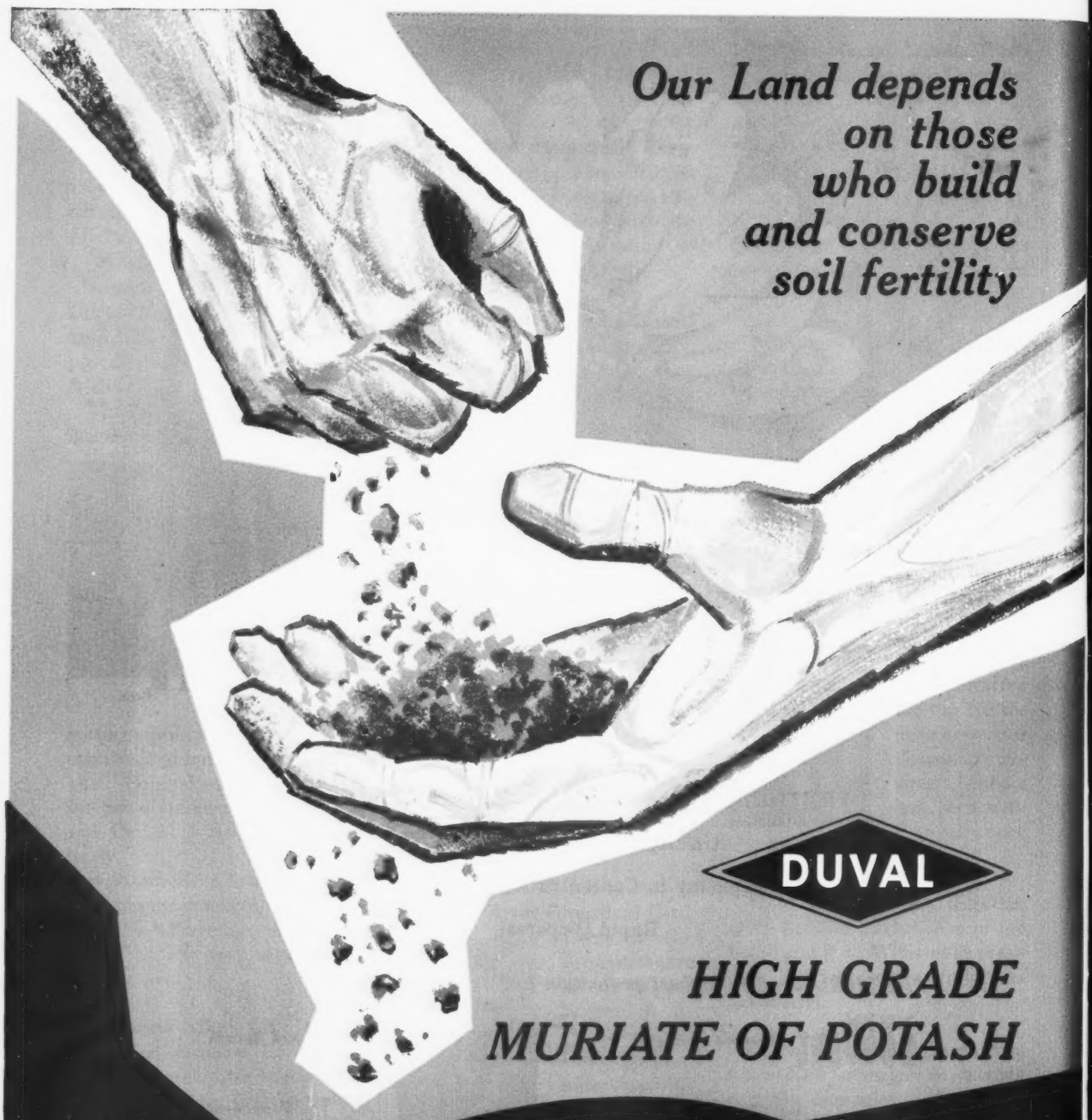
NAME_____

NO. ST._____

CITY_____ STATE_____

P·Y·R

AFRICAN PYRETHRUM



Our Land depends on those who build and conserve soil fertility

DUVAL

HIGH GRADE MURIATE OF POTASH

will help do the job!

High Analysis . Unsurpassed Service

DUVAL SULPHUR and POTASH CO.

Modern Plant and Refinery at Carlsbad, New Mex.

Address all communications to

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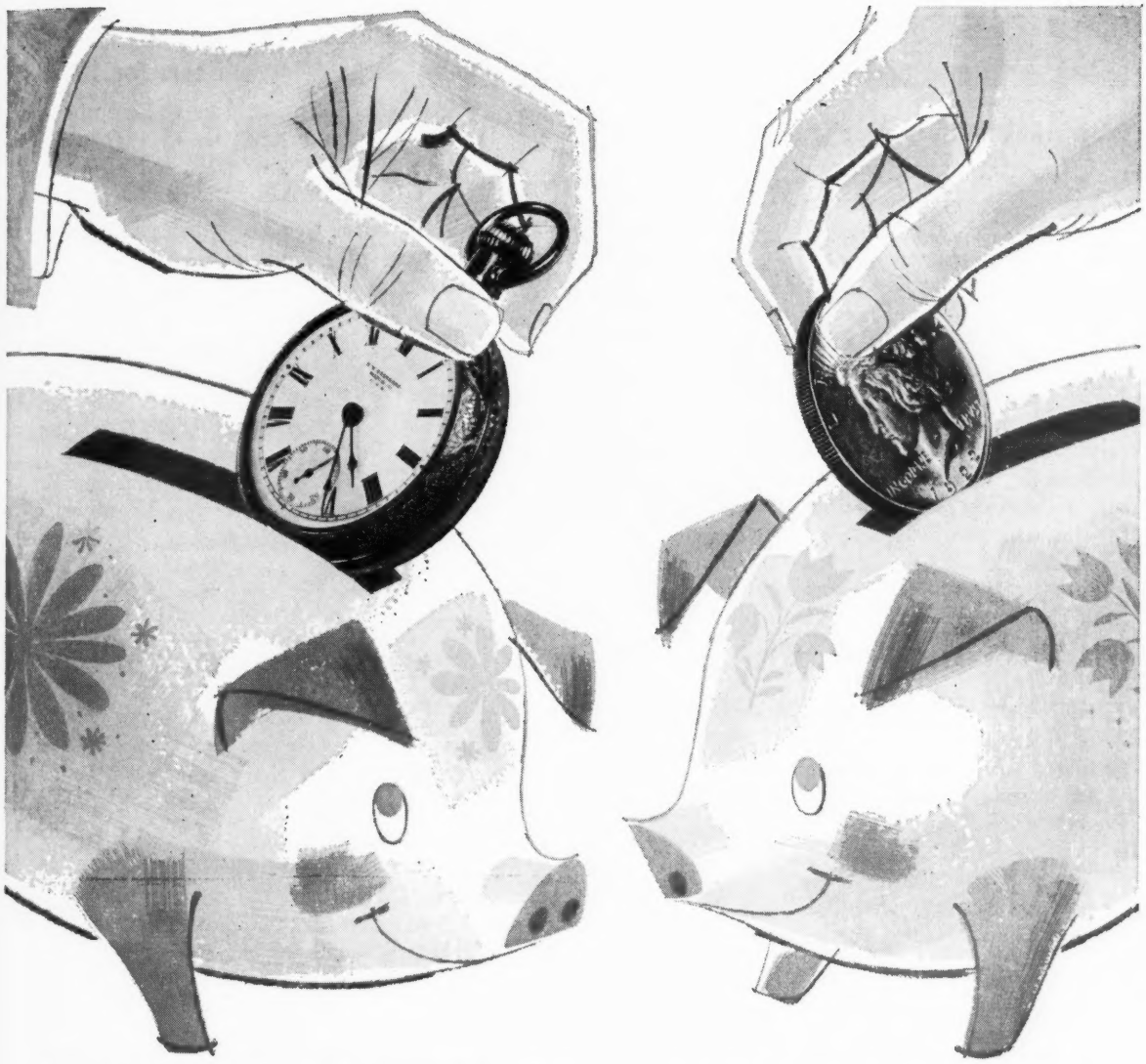

TIME IS MONEY... SAVE BOTH!

ORDER NITROGEN PRODUCTS FROM SINCLAIR NOW

There are two big reasons why you should sign now with Sinclair for your supplies of nitrogen solutions, anhydrous ammonia and aqua ammonia.

First – the completion and opening of a centrally-situated new plant in Hammond, Indiana, means substantial savings in delivery time and shipping costs for most Mid-West nitrogen users.

Second – your seasonal supply problem can be solved by this plant's vast storage capacity . . . products will be delivered when you need them to meet your production schedule.

Let Sinclair help you solve your nitrogen supply problems and save you time and money in the bargain. Phone or write . . .

SINCLAIR CHEMICALS, INC.

(Affiliate of Sinclair Refining Company)
600 Fifth Avenue, New York 20, N. Y. – Phone Circle 6-3600
155 North Wacker Drive, Chicago 6, Illinois – Phone Financial 6-5900

Associations & Meetings

New Time & Place for Garden Supply Show

A change in time and place of the 16th National Garden Supply Show has been announced. Previously scheduled for Kingsbridge Armory in the middle of January, the show will now be held in the New York Coliseum, Feb. 17–19, 1957.

The switch in plans was necessary in order to provide adequate facilities for the crowds of garden supply dealers expected to attend the Short Course in Retail Sales Management to be held on February 16 in the Park Sheraton hotel, said D. Murray Franklin, publisher of *Garden Supply Merchandiser*.

Randle Named ACS' Fert. Div. Chairman

Dr. Stacy B. Randle, state chemist at the New Jersey Agricultural Experiment Station, has been elected chairman of the American Chemical Society's Division of Fertilizer and Soil Chemistry for 1957.

NATA Elects Officers for 1957

Galen Bertram of Greensberg, Kansas, was elected 1957 president of the National Aviation Trades Association at the group's 17th annual convention held recently in St. Louis, Mo.

At the Aerial Applicators Conference of the convention, John Neace of Marsh Aviation, was reelected as vice president for agricultural activities and heads the National Aerial Applicator Committee of NATA.

Charles A. Parker continues as executive director of the association.

NPFI Awards to Editors, Agronomy Student

FREDERIC B. KNOOP, executive editor of *The Farm Quarterly*, and Ralph Sandlin Yohe, associate editor of the *Prairie Farmer*, recently were honored as two of the nation's outstanding agricultural writers, who most effectively carried the message of soil building to their farm magazine readers.

They were winners in the National Plant Food Institute's "Soil Builders Award for Editors" contest and received plaques, presented by Louis H. Wilson, NPFI secretary and director of information, at the winter meeting of the American Agricultural Editors' Association in Chicago, November 28.

Yohe was winner among the farm magazines with more than 300,000 circulation, and Knoop, among magazines with less than 300,000 circulation.

Walter L. North, Jr., of Pennsylvania State University, is winner of NPFI's Agronomy Achievement Award. Below, he receives a $200 check from Dr. W. H. Garman, chief agronomist of the institute.

In addition, North received an engraved key carrying the NPFI emblem. Made for outstanding leadership, character and scholarship, the award is presented annually by NPFI to the most outstanding junior majoring in agronomy.

Louis H. Wilson, NPFI secretary, presents Soil Builders' Awards to Ralph S. Yohe, PRAIRIE FARMER, and Frederick B. Knoop, FARM QUARTERLY.

W. H. Garman presents $200 check to Walter North, Penn State U.

. . . Associations & Meetings

NAC Distributes Pesticide Safety Kit

A SPECIAL kit of materials on pesticide safety for use in preparing company safety programs has been sent to its members by the National Agricultural Chemicals Association.

Containing a description of what was done during the association's 1955–56 safety program, as well as materials prepared by NAC, member companies and others, the kit also contains information which will be of assistance to those firms taking part in the 1957 program.

The 1955-56 NAC-Industry Safety Program was undertaken to "impress upon doctors, growers and the general public the fact that pesticides are safe to use if they are used according to label directions," reports the association. The information-education program falls into three general categories:

1. Informing doctors. More than 5,000 copies of "Clinical Memoranda on Economic Poisons" have been distributed to groups and to individual doctors who have requested it. A 1956 revision will be distributed during 1956–57.

2. Informing growers. In January, 1956, NAC offered a broadcast transcription bearing four talks on pesticide safety and safe use to 2,600 standard radio stations. By September, about 735 radio stations had used the transcriptions. NAC also has cooperated with farm and trade magazines and with the Farm Div., National Safety Council, to inform growers on safe use.

3. Informing the general public. Cooperation in supporting the 50th Anniversary of Food and Drug Laws celebration has resulted in some favorable publicity; namely, press stories on Florida Governor LeRoy Collins' Food and Drug Anniversary proclamation presented at NAC's spring meeting in Florida, a news release sent to 1500 press, radio and magazine editors as part of a Food and Drug press kit, a talk by L. S. Hitchner at the 60th annual meeting of the Food and Drug Officials of the United States, a display of the NAC NEWS during the same meeting and favorable comments by Senator Spessard L. Holland (D-Fla.) in the Congressional Record in connection with the celebration.

GPFES Schedules January Meeting

The fourth annual meeting of the Georgia Plant Food Educational Society will be held at the Continuing Educational Building, College of Agriculture Campus, University of Georgia, on January 15–16. The affair is a joint meeting with the Georgia section of the American Society of Agronomy.

"Fertilizer, Fertility, Finance," will be discussed by Monroe M. Kimbrel, president of the Georgia Bankers Association, during the banquet.

On the afternoon of the 15th, Dr. C. C. Murray, dean and coordinator of the College of Agriculture, will lead off with "A Comprehensive and Coordinated Plan for Increasing Net Farm Income in Georgia," followed by Dr. Russell Coleman, National Plant Food Institute, on "The Fertilizer Industry's Responsibility in Aiding Georgia Farmers to Attain Greater Net Farm Income."

A panel discussion is scheduled, with questions from the floor, on specific contributions that can be made by members of the society to the coordinated plan presented by Dean Murray.

Calendar

Jan. 8-9, 1957. Tex. Fert. Conf., Texas A&M, College Station.

Jan. 9-10. Wisc. Insect Control Conf., Loraine Hotel, Madison, Wisc.

Jan. 10-12. NE Weed Control Conf., McAlpin Hotel, New York.

Jan. 10-11. 3rd annual Insect Control Conf., State College, Miss.

Jan. 15-16. Ga. Plant Food Educ. Society, University of Georgia, Athens, Ga. Joint meeting with Ga. Sect., American Soc. of Agronomy.

Jan. 15-16. Nebr. Fert. Institute meeting, College of Agr., Univ. of Nebraska, Lincoln.

Jan. 21-25. Pacific NW Vegetable Insect Conf. and NW Coop. Spray Project, Imperial Hotel, Portland, Ore.

Jan. 22-24. Calif. Weed Conf., Fresno Memorial Aud., Fresno.

Jan. 23-24. Pacific NW Agr. Chemicals Industry Conf., Benson Hotel, Portland, Ore. Sponsored by Western Agr. Chemicals Assn.

Jan. 23-25. Southern Weed Conf., Bon Aire Hotel, Augusta, Ga.

Jan. 24-25. Ill. Custom Spray Operators School, Ill. Union, Univ. of Illinois campus.

Jan. 25. Colo. Agr. Chem. Assn. annual meeting, Cosmopolitan hotel, Denver.

Jan. 28-29. National Cotton Council, annual meeting, St. Louis, Mo.

Jan. 28-31. Plant Maint. & Eng. Show, Public Aud., Cleveland, O.

Jan. 31-Feb. 1-2. Agr. Aircraft Assn. annual convention, Senator Hotel, Sacramento, Calif.

Feb. 4-6. Cotton States Branch, Ento. Society of America, Birmingham, Ala.

Feb. 14-15. Joint meeting, Midwestern agronomists & fert. industry. Sponsored by Middle West Soil Imp. Committee. Edgewater Beach hotel, Chicago.

Feb. 17-19. 16th Nat. Garden Supply Show, New York Coliseum, NYC.

Feb. 19-20. Chemical Market Research Assn., Sheraton Hotel, Philadelphia.

Feb. 19-20. Ala. Pest Control Conf. & meeting of Ala. Assn. for the Control of Economic Pests, Auburn.

March 4-5. Western Cotton Prod. Conf., Westward Ho Hotel, Phoenix, Ariz.

March 6-8. NAC Assn. Spring Meeting, Fairmont Hotel, San Francisco.

March 27-29. North Central Branch, Ent. Society of America annual meeting, Des Moines, Iowa.

Are you good at figures?
EXAMPLE 1
Valve Bags for Granular or Pulverized Materials
If you increased filling production from 12 per minute to 15 or more per minute — without paying a penny more for sleeve or special insert bags... what would be the percentage of increase — and dollar savings to you — per ton — per hour?
EXAMPLE 2
Open Mouth Bags for Free Flowing Materials
If you increased filling production from 15 per minute to 20 or more per minute — without paying a penny more for your open mouth multiwall bags... what would be the percentage of increase — and dollar savings to you — per ton — per hour?

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Gilman Paper Company Subsidiary

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• Gummed Tape Div.
• The Coltwood Corp.
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check and mail today

- ☐ We are interested in Example 1.
- ☐ We are interested in Example 2.
- ☐ We are interested in both examples.

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We have the bags and the packer to effect such savings—*or more!*

Give us the time to give you the facts!

Dependable as a service for 3 generations. Exclusive Sales Agents for the Kraftpacker Automatic Filling Machine and one of the largest integrated producers of multiwall bags with plants in St. Marys, Georgia and Gilman, Vermont, manufacturing every type of multiwall bag in use today!

VIEWING WASHINGTON

with Farm Chemicals Washington Bureau

on agriculture

The multi-billion dollar Soil Bank program almost overnight has been thrown into danger of total collapse by the recent corn program referendum. Farmers chose to stick with the old acreage allotment program, rather than switch to the newer Soil Bank base acreage operation.

Here's the story: Farmers apparently voted to continue the acreage allotment because they were more familiar with how it works, and perhaps because under it, Secretary Benson could not lower price supports further than 75 per cent of parity. But under the allotment program, the 1957 allotment has been set at 37.3 million acres of corn in the commercial area. This is a 20 per cent cut from last year and is on top of other sharp acreage reductions.

Few, if any, farmers can afford to cut back to the low allotments in 1957 —unless they are increased. Unless the program is changed, it means unlimited production of corn in 1957 with no effective price support. Farmers will be more eager to grow corn than to join the Soil Bank. In addition, the corn decision jeopardizes the wheat Soil Bank program on farms where both are grown.

Under the Soil Bank Act, it is necessary for farmers who plant acreage allotment crops—such as wheat and corn—to comply with acreage allotments for each crop to be eligible for Soil Bank payments on either crop. With corn acreage sharply cut back for 1957 and wheat also reduced—and subject to soil bank contracts—USDA now fears that many wheat farmers will tear up their agreements for the 1957 Soil Bank. To a lesser degree, the same danger is seen on cotton-corn farms.

Unless USDA takes remedial action, Congress undoubtedly will. The Soil Bank program is a popular one in Congress, and it is doubtful that Congress will allow it to break down. Some important changes are likely. One change being considered could once again put the Soil Bank on sound footing. This would be to increase the 1957 corn allotment by at least five million acres to bring more farmers into compliance with the price support program and make them eligible for the Soil Bank.

The USDA, meanwhile, has announced a new method for determining acreage reserve payments that will give some farmers more cash than under the 1956 procedure. It establishes a national average payment per acre for corn, cotton and rice. This is expressed in dollars and is the sum of the average yields times a unit payment rate. The national average will be broken down into county averages per acre. Individual farm payments will vary from the county average on the basis of yields and management practices. Peanuts have been dropped from the Soil Bank program.

National average rates for 1957 will be $42.66 per acre for corn, $63.18 for rice and $54.50 for upland cotton. Wheat and tobacco rates are to be figured generally as they were last year—but will average $353.44 an acre for tobacco (average of the types) and $20.04 an acre for wheat.

VIEWING WASHINGTON

on business

Over-shadowing the optimistic business forecasts for 1957 is the long finger of inflation. The new year, according to economic forecasts from all sides, is to be "prosperous" for industry in general—with more boom coming up.

Main indicator of this is the fast rate in which industry is pouring money into plant and equipment. Here's the way the government figures this spending rate: Last quarter of 1955, industry spent at an annual rate of $31.5 billion. Third quarter of 1956, it hit $35.9 billion. Last quarter of 1956, it was about $37.3 billion. Now, it's heading toward $38 billion—and possibly higher later in the year.

But expansion costs more now—and may cost more in the new year. To prevent costs from breaking the boom severely some time in the near future credit curbs will be tight again in 1957. The Federal Reserve Board, under heavy fire from Congress and certain industries, shows no signs of bowing to the pressure. On the contrary, indications are the FRB will turn the screw even tighter early this year. It will take a strong hand to curb the upward spiral of prices, and FRB plans to use a strong hand—regardless of the brickbats.

Aside from the general trend of higher prices normally expected for 1957, an added stimulant to inflationary pressures are world shortages brought about by the tense international situation. The demands on this country from European contries shut off from supplies due to the Suez Canal crisis puts a new burden on industries of many basic materials which already are pushing the limit of production.

Higher prices for things the chemical industry needs for expansion and production definitely are ahead in 1957. Freight rates will be higher. Steel seems sure to go up again. Nickel price recently went up 15 per cent. Tin, rubber, burlap, jute and wool—imports affected by the Suez block-up—are sure to see price rises.

The Administration is staking its budget balancing program on the new "pitch" to Soviet Russia. President Eisenhower will propose an arms limitation program to the Reds. He apparently is not to suggest disarmament, but to put a control on further development and use of new atomic weapons. If an agreement on this eventually is obtained, the defense budget would stay at about current levels. If rejected, it very likely means increasingly larger budgets.

Taxes hang in the balance of this "pitch." If the U. S. can't get together on arms limitation with the Soviets, don't be surprised to see increasing government pressure for higher taxes. But even if there is such a limitation, don't look for any reduction in taxes during 1957. Present corporate tax structures are not expected to be changed this year.

Talk of excise tax relief still is popular on "the Hill," but chances for it grow slim. The Treasury Department recently gave proposals for tax cuts the most rugged treatment before a congressional hearing in recent years. "No tax cuts now," said the Department.

North*South*East*West

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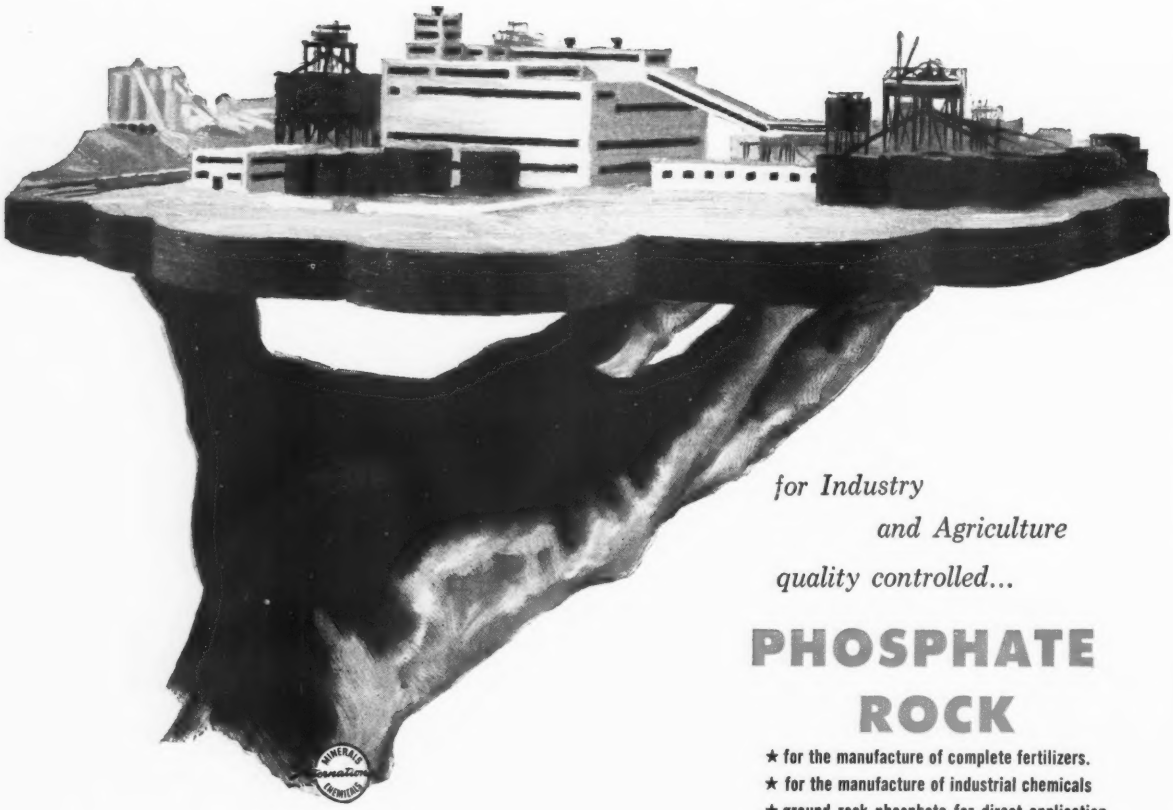

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Arcadian® News

Volume 2 | For Manufacturers of Mixed Fertilizers | Number 1

NEW—FROM NITROGEN DIVISION

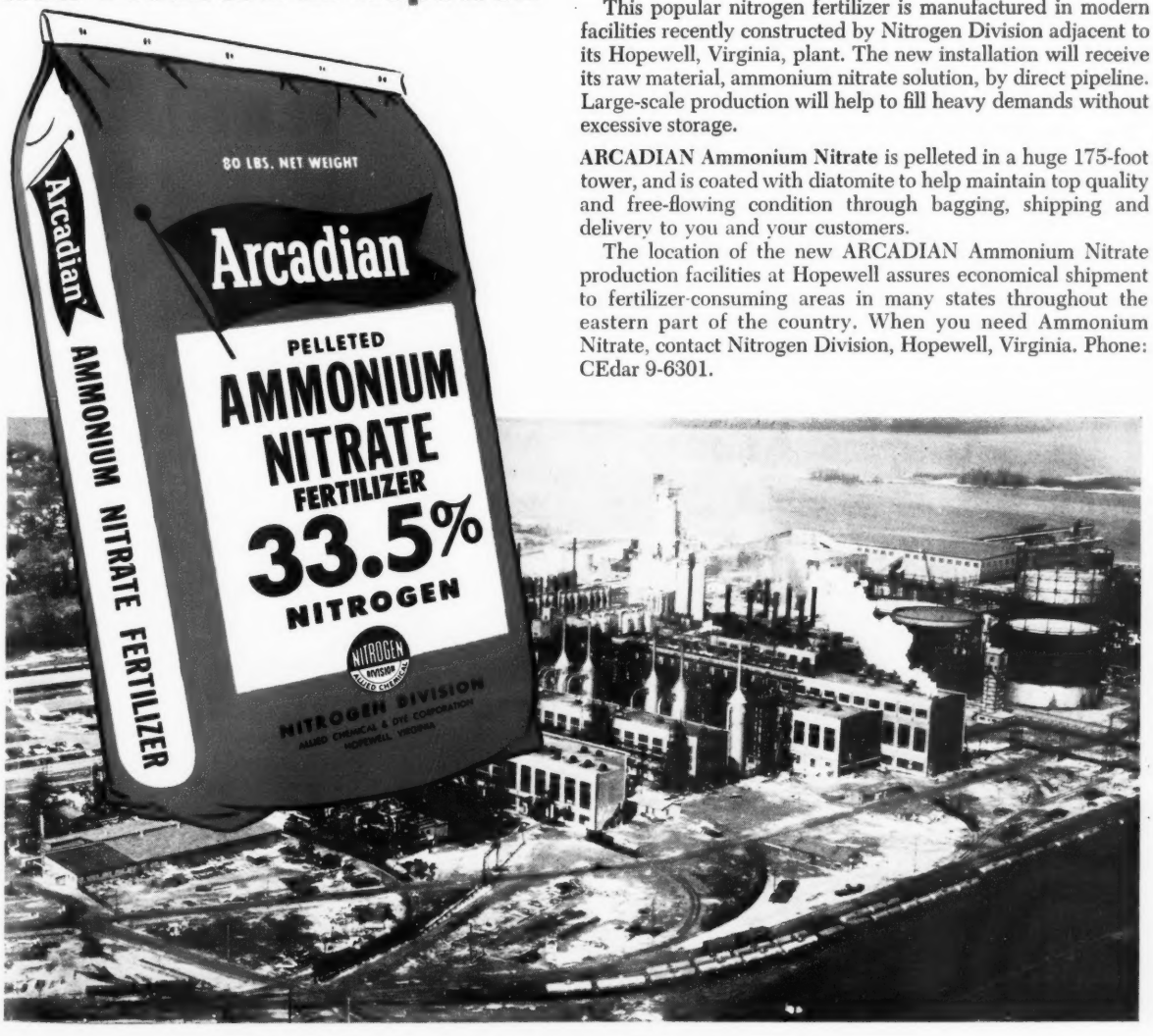
Pelleted Ammonium Nitrate Now Produced at Hopewell

ARCADIAN® Ammonium Nitrate, containing 33.5% nitrogen, is the latest addition to the complete line of nitrogen products now being supplied to the fertilizer industry by Nitrogen Division, Allied Chemical & Dye Corporation.

This popular nitrogen fertilizer is manufactured in modern facilities recently constructed by Nitrogen Division adjacent to its Hopewell, Virginia, plant. The new installation will receive its raw material, ammonium nitrate solution, by direct pipeline. Large-scale production will help to fill heavy demands without excessive storage.

ARCADIAN Ammonium Nitrate is pelleted in a huge 175-foot tower, and is coated with diatomite to help maintain top quality and free-flowing condition through bagging, shipping and delivery to you and your customers.

The location of the new ARCADIAN Ammonium Nitrate production facilities at Hopewell assures economical shipment to fertilizer-consuming areas in many states throughout the eastern part of the country. When you need Ammonium Nitrate, contact Nitrogen Division, Hopewell, Virginia. Phone: CEdar 9-6301.



Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION

Air Blast Guns Speed Roadside Fertilization

FAST, LOW-COST SPREADING OPENS NEW MARKETS IN HIGHWAY DEPARTMENTS

Air blasting pelleted fertilizer onto roadside turf is the new, labor-saving, low-cost way to fertilize grass for erosion control and improved appearance of rights-of-way. Two men with two guns and an air compressor, in addition to truck and driver, are all it takes to spread granular fertilizer this easy way.

Using the newest method, fertilizer bags are loaded in one layer. Each man stabs a bag at a time with a special point attached to a hose leading to the gun, points the gun at the roadside, and turns on the air pressure to blow the fertilizer onto the turf. There is no heavy work dumping bags, or even opening them. And no heavy water tank for liquefying the fertilizer needs to be filled and hauled.

Adapted from sand-blasting equipment, the guns are now in use by several highway departments. Early models of air blast guns required the men to open the bags. With the newest designs, the men just stab the bags and shoot!

Greater sales of pelleted and granular fertilizer to highway and turnpike authorities can now be expected. It will pay you to see your local highway officials. The present road network, plus 41,000 miles of federal highways now being planned, provide a big market.

This two-man highway crew is preparing to fertilize roadside turf with the help of new air blast guns.

Once over doesn't end the market, since roadside turf needs steady maintenance. In Maryland, where roadsides have been fertilized for some time, officials figure that fertilizer is needed every other year to keep turf in good condition.

Here's MORE SELL for your FERTILIZER

Now appearing in January issues of farm magazines, this powerful, full-page, two-color advertisement emphasizes your strongest sales point to more than 3½ million farm magazine readers. It leads off the 1957 series of a continuing campaign conducted by Nitrogen Division in behalf of the entire fertilizer industry. Like previous ads, it points out that every acre produces more profit with more fertilizer.

It also shows how fertilizer cuts down the zooming costs for land, labor and machinery per bushel of crop yield. That's why fertilizer pays off for farmers even more than before. In all these advertisements, farmers are advised to "see your fertilizer dealer." Nitrogen Division would be pleased to hear your reactions to this service program, in order to make it work harder for *you*.

Bringing EXTRA ACRES to your farm

Every truckload of fertilizer you buy brings the crop-producing power of extra acres to your farm without the cost of extra land.

Take corn land, for example. When you use enough extra fertilizer to make 80 acres produce the yield 120 acres would ordinarily produce, it's like adding 40 acres to your farm without costs for land, taxes, labor, machinery, seed and insecticides.

You invest more in fertilizer, but you greatly reduce per-bushel production costs. Here's how it works, based on actual results on good corn land in 1956:

$600 worth of fertilizer
produced **8,580 bushels** on **120 acres.**
$1,640 worth of fertilizer
produced **8,480 bushels** on **80 acres.**

All costs, including fertilizer, for the 120 acres were $7,040 and $6,336 for the 80 acres. With corn at $1.10 per bushel, the 80 acres produced approximately the same yield and $594 more profit than the 120 acres.

Fertilizer costs a lot less than land. More fertilizer per acre can help you produce your usual total yield of corn on fewer acres at greater profit, enabling you to put more land into the soil bank or other crops. This makes dollars and *sense*. Get the advice of your county agent and your fertilizer dealer.

NITROGEN DIVISION ALLIED CHEMICAL

The fertilizer industry serves the farmer. Nitrogen Division serves the fertilizer industry as America's leading supplier of nitrogen, the growth *element in mixed fertilizers. Nitrogen Division, Allied Chemical & Dye Corporation, 40 Rector St., New York 6, N.Y.*

Fertilizer Grows Farm Profits

Greater Use of Fertilizers Builds Bigger Crop Profits from Irrigation

The farmer who digs an irrigation well or who starts pumping water from streams or ponds is a good prospect for more fertilizer. And irrigation is growing fast, even in the so-called humid Eastern states, according to the Agricultural Research Service of the U. S. Department of Agriculture.

Most years irrigated crops out-yield dryland crops by a big margin. Even in areas where rainfall is enough to mature good crops the better timing of irrigation often increases yields. Naturally, it takes more plant food to produce these bigger yields consistently. Good farming calls for a greater tonnage of fertilizer when irrigation water is available.

Farmers now water 30 million acres of land per year—nearly one-tenth of the U. S. harvested crop acreage. Western states already irrigate a large fraction of the land for which water is available. Growth in the East is now rapid. In 1956 some states irrigated twice as many acres as the year before.

Pasture and grass irrigation takes the acreage lead in the East, while vegetable crops show the greatest income increase per acre. Tobacco irrigation in North Carolina has doubled each year since 1951.

The more water available, the more fertilizer crops can use effectively. As irrigation grows, it builds concentrated fertilizer markets.

Fertilizer Rejuvenates Corn Land Unfertilized For Seventy-Eight Years

Good soil worn down to 29-bushel corn yields by 80 years of continuous cropping without fertilizer got a new lease on life with the addition of plant food in 1955-56. This is the report of University of Illinois agronomists on the famed Morrow plots—the nation's oldest soil experiment test.

Since 1876, the check plot received no fertilizer. Yield was 29 bushels per acre in 1956, and averaged only 22 bushels from 1944 to 1955.

Continuous corn unfertilized until 1955 and 1956, when it got heavy doses of lime, nitrogen, phosphorus and potash, yielded 113 bushels in 1956, and 86 bushels in dry 1955.

Not all run-down soils can be brought back fast, the Illinois agronomists point out. These plots were on originally deep, fertile soil that has kept some of its good physical condition.

Fertile Pasture Strips Make Better Fire Lanes

Well-grazed pasture strips make good, low-cost fire lanes in Southeastern woods. North Carolina uses 18-foot wide sod strips. A combination of legumes and grass, well-fertilized for a good stand, provides fine pasture and green, nonflammable cover. The sod also makes a good base for travel by fire-fighting equipment.

See Our TECHNICAL SERVICE Representative

for expert help on all your plant problems—skilled help based on more than 27 years of fertilizer experience. Our technical men's know-how is always available to customers.

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Nitrogen Solutions:

URANA®
NITRANA®
U-A-S*
N-dure*

Other Nitrogen Products:

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Urea Products
A-N-L®
Ammonium Nitrate
Sulphate of Ammonia
American Nitrate of Soda

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NITROGEN DIVISION Allied Chemical & Dye Corporation

40 Rector St., New York 6, N.Y.

Hopewell, Va. — Indianapolis 20, Ind.
Ironton, Ohio — Columbia 1, S. C.
Omaha 7, Neb. — Raleigh, N. C.
Columbia, Mo. — Atlanta 3, Ga.
Kalamazoo, Mich. — Los Angeles 5, Cal.
St. Paul 4, Minn. — San Francisco 4, Cal.

FREE INFORMATION to help you solve fertilizer, pesticide problems

Reader Service

Chemicals

1—Mercaptans

Pan American Chemicals Corp. announces the availability of technical data sheets on mercaptans which are finding application in the formulation of farm chemicals. Complete description of the materials—chemical and physical properties and the various applications of the chemicals—are provided. ICC regulations and handling advice are also covered in the presentation. For your free informative copies just

CIRCLE 1 ON SERVICE CARD

2—Forest Fertilization

The practice of fertilizing forests to increase wood production is considerably more important to this country than it was in the past. To expand the useage of fertilizers, Nitrogen Division of Allied Chemical and Dye Corp. has made available a report of work carried out in Germany in forest fertilization programs there. The 119 page book is available without charge and provides many new ideas on increasing forest production. For your free, illustrated copy,

CIRCLE 2 ON SERVICE CARD

3—Nitrogen

United States Steel Corp. has announced the availability of three pamphlets giving the complete background on the importance of nitrogen in the cultivation of crops. The material covers such areas as how nitrogen improves germination, improves the soil and promotes strong root growth. Additional information is available on the South and its relationship to nitrogen useage in agriculture. Send for your free copies.

CIRCLE 3 ON SERVICE CARD

4—Sulfuric Acid

Thirty six helpful pages are offered by General Chemical Div., Allied Chemical and Dye Corp., on sulfuric acid. Areas of interest regarding this essential chemical are physical properties, storage and handling methods. Also included in the informative booklet are methods of analysis, including charts and tables of both sulfuric acid and oleum. No consumer of this chemical should be without this helpful and handy technical data booklet. For your free copy just

CIRCLE 4 ON SERVICE CARD

5—Ammonia Bulletin

A 48 page guide book on agricultural ammonia has been made available by Commercial Solvents Corp. Presented in the book are timely articles on the proper handling of the material, application and uses, as well as its properties. For this free information just

CIRCLE 5 ON SERVICE CARD

6—Safety Booklet

Monsanto Chemical Co. has available a new booklet for pilots on the proper handling of chemicals. It offers advice on the correct way to apply materials as well as on the methods used in the reduction of chemical exposure. A small, handy booklet, it should be must-reading for pilots or anyone engaged in the application or handling of farm chemicals. Your free illustrated booklet is available if you

CIRCLE 6 ON SERVICE CARD

7—Fertilizer Supplies

Free information is available from the American Agricultural Chemical Co. on such products as agricultural grade phosphoric acid, rock, superphosphate and other grades used in agriculture. Sulfuric acid and insecticide-fungicide information is also available for the asking. Write in for a free bulletin on the products which interest you.

CIRCLE 7 ON SERVICE CARD

How to use the

READER SERVICE CARD

- **Circle number of literature you want.**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

8—Chem-Vape

A new one-shot chemical marketed under the name of Chem-Vape has been announced by Chemical Insecticide Corp. Designed to control insects as well as weeds, the material is low in toxicity to warm blooded animals and leaves the soil in a relatively short period of time. First indications are that the material will find application on seed beds of vegetables and ornamentals, plus tobacco. Chem-Vape is a dithiocarbamate liquid. For more free details on this new product just

CIRCLE 8 ON SERVICE CARD

Process Equipt.

9—Temperature Regulator

A new safety-type temperature regulator is available from the Fulton Controls Co. which will close automatically to prevent overheating and possible damage to products in process, in the event the thermostatic unit is accidentally damaged. Another feature of the new regulator is a heavy gauge stainless steel frame. Equipped with reverse acting valves, the regulators are suitable for the flow control of cooling water to transformers, internal combustion engines and air compressors. Information is available by requesting the number below.

CIRCLE 9 ON SERVICE CARD

10—Roller Chain

Double strand roller chain sprockets that require no reboring or other machining for installation on shafts are being added to the Taper-Lock sprocket line now offered by Dodge Manufacturing Corp.

Available in pitch sizes ranging from one-half inch to one inch, the new double strand sprockets meet the demand for greater capacity roller chain drives with all the easy-on, easy-off features of Taper-Lock. Detailed information on these new roller chains is available if you

CIRCLE 10 ON SERVICE CARD

11—Conveyor Belt Cleats

A molded meoroene screw-on cleat has recently been developed that will convert any conveyor or elevator belt into a cleated-belt. Cleats are attached to the belt by flat head machine screws and special counter-sunk washers secured to threaded metal inserts vulcanized in the base of the cleat. Finding application in the fertilizer industry, the cleat design eases the problem of changing width and height of the cleats and in the replacement of belts. Additional information is available if you

CIRCLE 11 ON SERVICE CARD

12—Screw Conveyors

Link-Belt Company offers a 92 page data book on screw conveyors. Information covers the specifications and types available. Designs vary according to temperature, corrosion, sanitation and abrasion requirements, and the booklet also covers a full range of diameters, gauges, and pitches. For your copy of this book containing free information, just

CIRCLE 12 ON SERVICE CARD

13—Hammer Mill

Complete information is now available on the Sprout-Waldron hammer mill, model HD. A new bulletin just released gives detailed information on its construction. Various installation arrangements are also outlined and illustrated in the bulletin. Included are descriptions of the conventional products collecting systems which are available for use with the hammer mill.

CIRCLE 13 ON SERVICE CARD

14—Grinding Machines

Sturtevant Mill Co., maker of Micronizer grinding machines, has available literature on this machine as well as others which it manufactures. Full information is provided in bulletins on crushers, blenders, granulators, conveyors and separators. Information which will be of assistance in reducing manufacturing costs is presented. Your free copies are available by indicating below.

CIRCLE 14 ON SERVICE CARD

15—Packaging Work Kit

In order to help fertilizer manufacturers figure their bagging costs, Union Bag-Camp Paper Corp. has available a kit which will help determine costs on a per-ton basis and at a per thousand bag production rate. Included in the free calculating kit are costs of cotton thread, rayon and filter cord. Your free copy can be secured by indicating below.

CIRCLE 15 ON SERVICE CARD

16—Liquid Fertilizer Hose

A hose treated with a synthetic rubber lining capable of handling ammonia nitrate solutions and petroleum products is available from Hewitt-Robins. The outside covering is protected from sunlight and oxidation by neoprene. For further details on this hose, available in sizes from ¾ inch to one inch in diameter, just circle below.

CIRCLE 16 ON SERVICE CARD

17—Liquid Meters

The complete line of Rockwell Mfg. Co. products is described in a booklet recently made available. Included in the 16 page edition are such subjects as temperatures, viscosity, pressure and registration data which are all necessary in proper plant operation. It offers more complete data on meter construction, explaining with the aid of tables and charts, which case, piston and chamber are best suited for use with specific liquids. For a free informative copy

CIRCLE 17 ON SERVICE CARD

18—Belt Conveyor Idlers

Complete details are available from the Joy Manufacturing Co. on its complete line of conveyor belt idlers. Description of the flexible idlers is given in the free literature. Designed of neoprene and attached to flexing steel cables, the rollers have little chance to collect dust of fertilizers while in operation. The action of the flexing steel cable reduces abrasion and corrosion. For additional details on this cost-reducing device, just

CIRCLE 18 ON SERVICE CARD

How to use the

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- **Circle number of literature you want**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

Materials Handling

19—Truck Line Brochure

The Yale & Towne Manufacturing Co. has published a new brochure covering in detail the various models in its line of gasoline and LP-Gas powered lift trucks.

The booklet includes key features and specifications of trucks from 2000 to 10,000 pounds capacity, with cushion or pneumatic tires and with Yale torque transmission. Details are also given for special trucks in the Yale line such as dust protected trucks. For further details on this complete line of trucks

CIRCLE 19 ON SERVICE CARD

Packaging

20—Bagging Scale

Richardson Scale Co. has available a new bulletin describing a new high-speed automatic fertilizer bagging scale, capable of bagging up to 24 sacks per minute. Included in the description of the bagger are such features as design simplicity, automatic operation, dust tight construction and many others. A free copy is available if you

CIRCLE 20 ON SERVICE CARD

21—Frostkraft Bags

Olin-Mathieson Chemical Corp. now has available a new booklet on the Forest Products Division, maker of various paper products such as multi-wall bags, corrugated containers, and bags. The brochure illustrates the methods of procedure in the manufacture of the various items mentioned. For some interesting and informative reading send for your free copy by indicating below.

CIRCLE 21 ON SERVICE CARD

22—New Bagging Device

A new bag opening and loading machine has been announced by the Errich International Corp. Called the "Speedy Bag Packager," it opens and loads all types of bags. The machine also handles lip bags and gussetted bags as well as paper and polyethylene type containers. Further information on this new machine is available if you

CIRCLE 22 ON SERVICE CARD

Miscellaneous

23—Fertilizer Conditioner

U. S. Graphite Co. has available free information on its product, Graflow, which reduces caking and corrosion of fertilizer manufacturing equipment. When applied to either granular or pulverized fertilizer it enhances flowability, cuts down on curing temperatures and improves fertilizer drillability. Made up mainly of high quality graphite the material is chemically inert. Send today for free information on this product.

CIRCLE 23 ON SERVICE CARD

24—Insect Booklet

Over 532 illustrations are given in Hercules Powder Co.'s new booklet entitled, "Handbook of the Insect World." The handbook, which took over two years to compile, contains brief description of the insect and also its classification by entomological order. It is believed to be the first book to include illustrations of most of the common insects in one volume. For your copy

CIRCLE 24 ON SERVICE CARD

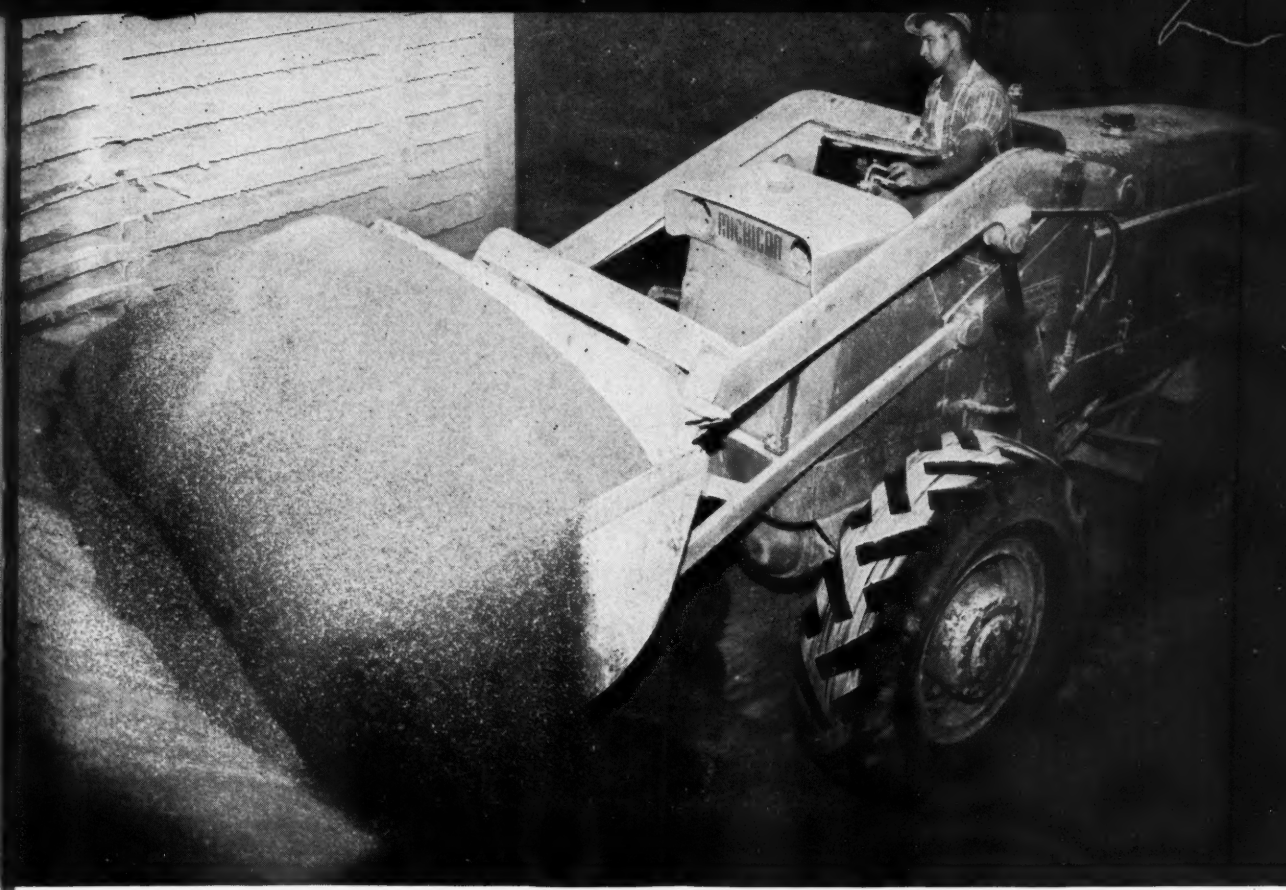
25—DDT Medical Release

The American Medical Association has released an interesting report on the effect of DDT on man. The investigation covers the first experimental work carried out on humans. By relating excretion to dosage, the study makes practical the quantitative estimation of the dosage for persons with extensive occupational exposure to DDT. For your free informative copy,

CIRCLE 25 ON SERVICE CARD

See pages 58 & 59 for information on these Reader Service Numbers—

26—Step-Flex **28—Pellet Cooler**
27—Carriage Conveyor **29—Carton-Display**
30—Bristol System



Dust a problem in your material handling?

Here's how Michigan Tractor Shovels help Swift & Company

Swift & Company's plant food division at Madison, Wisconsin has the usual problem encountered in the processing of raw materials such as potash and superphosphate, and in handling the finished plant foods.

Equipment used in these processes is exposed to long hours of continuous maneuvering while handling the bulk materials. Equipment must be durable to withstand the heavy loads, quick stops, and grit of raw material acting on the machine. Swift officials report the one-yard 77 hp Michigan Model 75B shown has given excellent results in meeting these requirements.

Moving potash 110 ft from bin to mixer, Michigan is timed delivering 60 loads (97,200 lbs) per hour. Unit changes direction and speed at flick of power-shift lever. No clutching needed.

Works round-the-clock

"It is dependable," says Madison Assistant Superintendent Harry Peeler. "It worked round-the-clock during our latest two-month rush season. Its only stops were to add fuel, inspect oil, and change operators. We've had no troubles with grit in the power-train . . . and no axle failures."

Ken Kremelling, veteran tractor shovel operator, says, "Michigan's torque converter helps you heap big loads fast. Low bucket-carry helps you keep what you load. Power steer takes you around turns fast. And power shift helps you start back for the next load fast."

See Michigan advantages for yourself

A trial in your plant will show you how these same advantages can pay off for you. Write for details on the size Michigan that interests you—6, 10, 15, 20 or 27 cubic feet; 1, 1½, 1⅝ or 2¼ cubic yards.

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GOVERNMENT

TVA Studies New Nitric Phos. Process

A new method for manufacturing nitric phosphate fertilizers is reported under development by Tennessee Valley Authority at Wilson Dam, Ala.

Early test runs in TVA's continuous ammoniator pilot plant have indicated that the ammoniator can be utilized in producing nitric phosphate. Equipment costs could be cut in half and operating costs lowered if the new process proves successful.

ICA Authorizations

Iran. $15,000—nitrogenous ($6,000), potash ($2,500), phosphates and other fertilizer materials ($6,500)—PIO/C No. 65-13-075-5-51250. Source: USA & poss. Terminal delivery date: Sept. 29, 1957. Procurement through Emerg. Proc. Serv., GSA.

Republic of Korea. $10,000,000—nitrogenous ($7,000,000), potash ($280,000), phosphate and other fertilizer materials, including mixed fertilizers ($2,720,000)—PA No. 89-230-99-J2-7002. Contract period: Dec. 31, 1956 to January 31, 1957. Source: World wide. Terminal delivery date: March 30, 1957.

$4,000,000—nitrogenous ($3,000,000), potash ($100,000), and phosphate and other fertilizer materials, including mixed fertilizers ($900,000)—PA No. 89-230-99-J2-7001. Contract period: Dec. 20, 1956 to March 31, 1957. Source: World wide. Terminal delivery date: May 31, 1957.

Barter provision applies to above two authorizations. Any offer to supply commodities involving sales price of $100,000 or more, made on a bid basis pursuant to an invitation for formal bids, which express willingness to receive CCC surplus agricultural commodites in full payment shall have preference over any other bid where price and other terms are equal.

$50,000—calcium chloride and anhydrous ammonia (PA No. 89-390-99-H9-7203). Contract period: Nov. 19, 1956 to May 31, 1957. Source: World wide. Terminal delivery date: Nov. 30, 1957.

Philippines. $732,000—dieldrin, 50 per cent wettable powder, and sprayer nozzle tips (PIO/C No. 92-51-013-5-79001). Source: USA & poss. Terminal delivery date: Dec. 31, 1956. Proc. through Federal Supply Serv., GSA.

Taiwan (Formosa). $700,000—agricultural pesticides (PA No. 84-236-99-H9-7002). Contract period: Dec. 1, 1956 to March 31, 1957. Source: World wide. Terminal delivery date: May 31, 1957. Barter provision applies to above authorization.

Vietnam. $1,200,000—nitrogenous ($800,000), potash ($200,000), phosphates and other fertilizer materials ($200,000), PA No. 30-230-99-H9-7010. Contract period: Nov. 5, 1956 to March 31, 1957. Source: World wide. Terminal delivery date: Aug. 31, 1957.

$200,000—agricultural pesticides (PA No. 30-236-99-H9-7011). Contract period: Nov. 6, 1956 to March 31, 1957. Source: World wide. Terminal delivery date: Aug. 31, 1957.

More N and Lime for Southeast Cotton Land

Substantially increasing the use of nitrogen and lime on cotton land in the Southeast results in higher yields of cotton per acre, said USDA recently.

Studies of cotton soils and nutrients required for producing cotton at a rate exceeding one bale per acre have been conducted by USDA and soil scientists of the state agricultural experiment stations at Stoneville, Miss., and Thorsby, Ala.

Results show that it will pay farmers with better cotton soils to step up their use of nitrogen to four times the present average annual rate of 26 pounds an acre. For greatest yield benefit, phosphorus, potash and sulfur should be applied in accordance with soil-test recommendations, and adequate liming should be done to offset the increased soil acidity created by heavier use of nitrogen.

Govt. Air-Spray Contracts Highest Ever

Aerial operations against insects under USDA-state contracts in 1956 were the most extensive in history, USDA reports.

Under these contracts, aircraft sprayed and dusted insecticides on areas throughout the country totaling more than five million acres. If repeated treatments against the Mediterranean fruit fly are counted, this figure is swelled to some 9 million acres, according to plant-pest control officials of USDA's Agricultural Research Service.

In the 1956 Federal-state cooperative aerial programs, four insects—grasshoppers, spruce budworms, Mediterranean fruit flies and gypsy moths—were main targets. Other important air operations were Mormon cricket control on 58,000 acres in 5 western states; beet-leafhopper control on 12,000 acres in Idaho; tussock-moth control on 10,000 acres in 3 states and spittlebug control on 3,000 acres in Wisc. and Mich.

This compares with a total of 4.2 million acres in 1950; 1.9 million in 1951; 1.5 million in 1952; 1.4 million in 1953; 2.5 million in 1954; and 4.2 million acres in 1955.

SULPHUR

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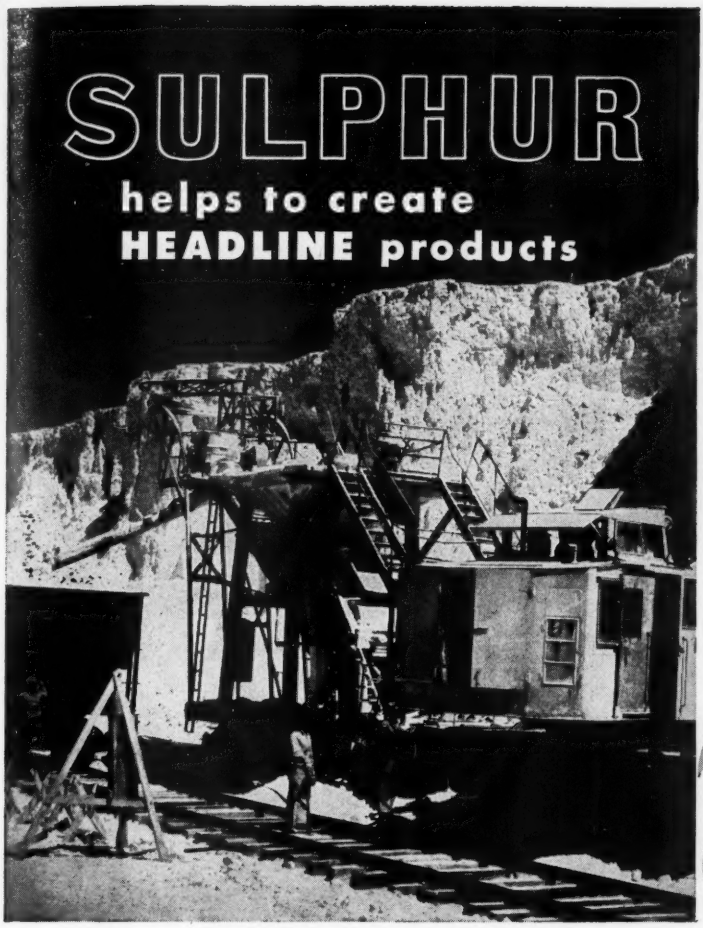

Thiokol®

"Thiokol" synthetic rubber, is an organic polysulfide elastomer. One of its many uses is in solid propellents for long range and high altitude missiles. In liquid form, "Thiokol" synthetic rubber mixed with an oxidizer, is poured into specially designed combustion chambers of rockets. It helps to give stability to the fuel charge and resistance to shock. It promotes uniform burning. When the rocket motor is ignited the mixture burns with great intensity and generates large volumes of gas to propel the rocket.

Solid propellents made with "Thiokol" synthetic rubber have proved their value in rockets over liquid propellents in many ways: they are less costly and easier to manufacture—simple and rugged construction makes handling and launching easier and safer—fuel tanks and complicated feed systems are eliminated.

"Thiokol" synthetic rubber is a product containing a high percentage of Sulphur—its name being derived from the Greek words for sulphur and glue. Here is another example of the continually broadening field in which Sulphur is an important and necessary element.

**A trade name of Thiokol Chemical Corporation.*

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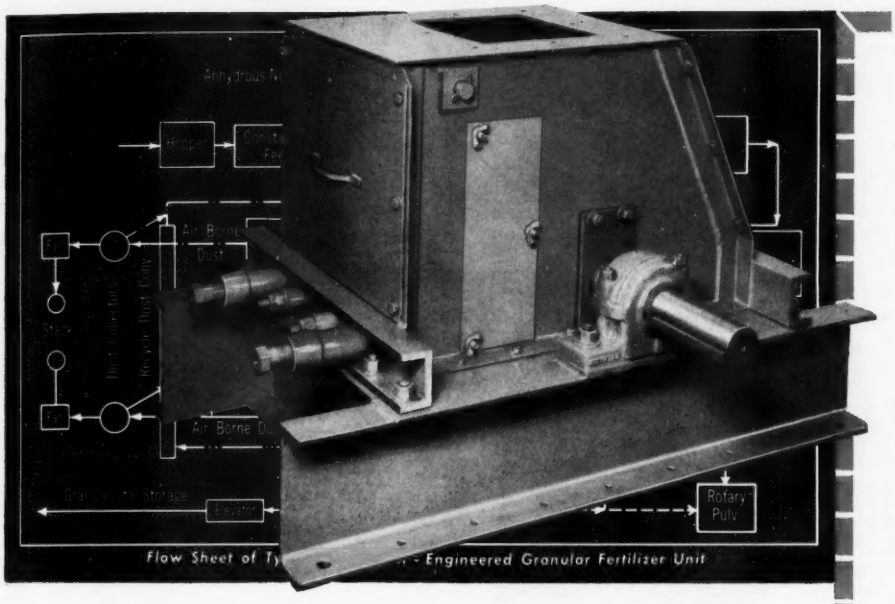
This Rotary Pulverizer Belongs In Your Fertilizer Unit, Too!



Flow Sheet of Ty... - Engineered Granular Fertilizer Unit

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Mixing plant operators agree! They'll tell you that a Sturtevant Rotary Pulverizer beats anything else for keeping a granular or powdered fertilizer unit speeding along at full capacity. It's far better than Hammer Mills with hammers that stick . . . Cage Mills that skip small pellets . . . Knives that only slice and shear. No overload stoppages nor clogged grates. So, daily accumulation of over-sized lumps is no longer a problem. And, to top it off, original Sturtevant "Open-Door" accessibility makes cleaning quick and easy.

Sturtevant Engineering can also help you in other ways. For more than 75 years, leaders in the fertilizer industry have depended on us for assistance in designing their units and in keeping them up-to-date. Since we custom-build mixers, batching units, granulators, hopper and conveying systems to fit agreed-upon specifications, you can be sure of getting a complete unit or individual components that fit your requirements like a glove. Why be satisfied with anything less?

Investigate now! Filling out the convenient coupon at the right is the first step toward better fertilizer at lower cost. Why not mail it today?

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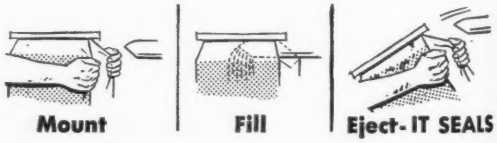

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American Phytopathological Society Meeting

CINCINNATI, OHIO, was the site of the 48th annual meeting of the American Phytopathological Society on December 5–8. Presented are summaries of papers given during the meeting which are of interest to the pesticide industry.

Southeastern farmers shipping radishes to market will benefit by dipping their produce before shipping in a weak solution of Terramycin at the packing plant. Treatment prevents development of pitting disease on the surface of radishes. The disease started when packers began shipping in plastic bags to increase sales. This also promoted development of radish pit. Five minute treatments with 10 parts Terramycin per million of water prior to shipping prevented the disease.

R. S. Cox, *Univ. of Florida*

Root and stem rots of poinsettias grown under greenhouse conditions can now be controlled by applications of five fungicidal chemicals. Semesan and Panogen when applied as a drench on soil or sand gave effective control. Captan, Terrachlor and zineg controlled rot organisms only on sand. Drenches should be used before the cuttings are set and whenever rooted cuttings are moved from one container to another.

Paul M. Alexander, *Ohio State Univ.*

Scald, a disease common to alfalfa grown in California's hot, dry Imperial valley, is most apt to develop after irrigation during an especially hot period. Research has shown that high soil temperature and high soil moisture interact to encourage scald. Investigations indicate that the temperature of irrigation water must be above 104° to 107° F. to damage alfalfa in the field.

D. C. Erwin & W. W. Kennedy, *Univ. of California*

Nemagon has effectively reduced damage of root-lesion nematode on Pacific Northwest apple stocks by application of the chemical at 10 gallons per acre. Apple stocks are frequently propagated by layering in this area and surveys showed that 83 to 100 per cent of all maiden apple stock was infected. Applications of the chemical were applied during the growing season without damage.

J. E. Bosher & W. Newton, *Canadian Dept. of Agri.*

Vapam, when used at 200 to 260 parts per million of water, gave control of root rot disease on avocado trees. Although it proved promising in control of root rot fungus, it was also found to be damaging to the avocado trees. Scientists believe that the chemical shows most promise as a disease eradicant in limited grove areas where trees already have been destroyed or badly damaged by the rot. After treatment there was no evidence fo the fungus in the normal avocado root zone of the treated soil for as long as a year after treatment.

G. L. Zentmeyer & J. L. Espaner, *Univ. of California*

An organism tentatively identified as a species of Micromonospora, *belonging to the group Actinomycetes, has given control of fusarium wilt fungus. Applications have reduced the disease by 75 per cent in experiments, after roots of tomato seedlings were soaked in the filtrate containing* Micromonospora *four days. Indications are that the metabolites of the* Micromonospora *were the active agents against the wilt fungus.*

Glenn E. Smith, *Ohio State University*

Hopes for a variety of tomato resistant to tobacco mosaic virus disease have been complicated by proof that there now exist three strains of the virus. Current investigations have been abandoned of seeking resistant strains in domestic breeding materials. Work has turned to the possibility of finding resistance to the disease in wild species of tomato.

J. J. McRitchie & L. J. Alexander, *Ohio State Univ.*

Stunting disease of California roses caused by lesion nematode can be controlled by soil fumigation where roses are to be grown. Work carried out with three fumigants—chloropicrin, EDB and D-D—showed outstanding results. Applications of the materials increased growth by two and one-half times. Nematode populations were reduced 95 to 97 per cent. Treatment of the planting areas was carried out one month prior to the planting of rose cuttings. ▲

S. A. Sher, *Univ. of California*

Are you cheating yourself? Read this article on displacement metering

By Paul Mankin
Chief Engineer
Rockwell Manufacturing Co.

Liquid Fertilizer Measurement

ACCURATE measurement is a necessity in dispensing liquid fertilizers. In loading at producer mixing sites, unloading at wholesalers' liquid storage, delivery, storage to tank trucks and ultimate delivery to the consumer, meter accuracy is a prime concern. For this reason, positive displacement metering of liquid fertilizers has become widespread.

Where measurement of total liquid flow is required, positive displacement metering is the best known method-of accurately measuring liquids.

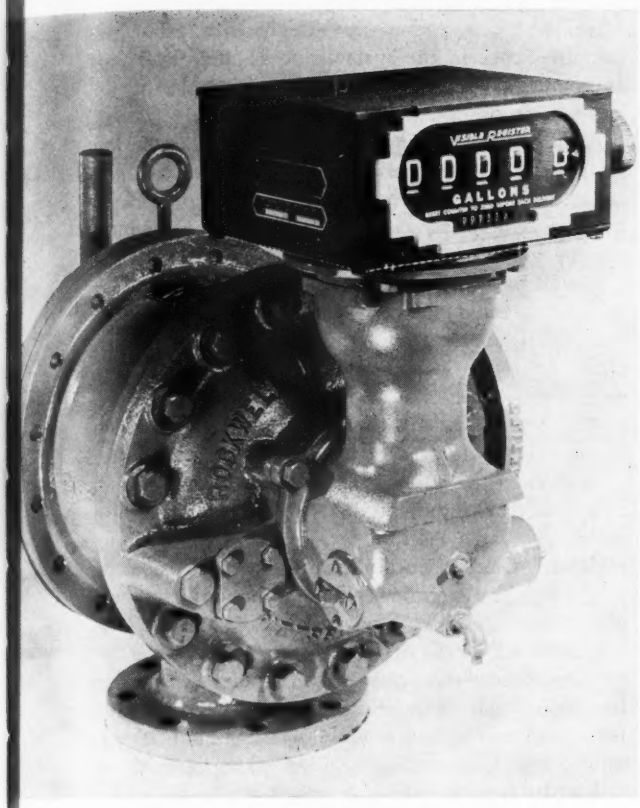
However, meter materials and the physical metering installation will often vary according to the fertilizer and the process. To use this accurate measuring device correctly, distributors should be familiar with the concept of positive displacement metering, installation procedure and maintenance.

Positive Displacement Meter Design

A positive displacement meter may be considered divided into two sections: A sealed-off section between inlet and outlet connections to isolate temporarily the incoming liquid stream, and a measuring chamber or chambers which are either liquid or mechanically sealed.

The meter operates on fluid pressure, and it measures by liquid filling the measuring chamber—emptying, filling, emptying, and so on, ad infinitum. The capacity of the measuring chamber remains constant; obviously, if some device records the number of times the known volume of the measuring chamber is filled, the total flow through the meter may be obtained by simple multiplication. Although over-simplified, this is essentially what goes on.

In the measuring chamber, the incoming stream is divided into a number of equal volumes (the number varies with the type of meter). The liquid pressure from each volume pushes a piston, or vane, and then is discharged from the meter. Each push is transmitted through gearing to a counter. The



Half-moon rotary positive displacement meters in all-ferrous construction are widely used for bulk and tank handling of liquid fertilizers. Accuracy and repeatability of this type of meter are excellent.

counter totals the number of pushes continuously, and translates the sum into gallons (or other volumetric units).

All six principal types of meters commonly available—half moon rotary, oscillating piston, sliding vane rotary, two-spiral fluted rotor, conventional vane rotary and conventional piston—operate essentially in this fashion.

Meter Selection

In general, selection of the correct positive displacement meter for a specific application depends upon certain characteristics of that application—pressure, viscosity of the liquid, temperature, particles or impurities present, etc. In metering liquid fertilizers, rotary positive displacement meters of all-ferrous construction receive wide application. Designed to handle aqueous ammonia, ammonium phosphate and other low vapor pressure materials, the all-ferrous meters have the additional advantages of versatility. They can be switched from one recommended service to another—for example, from metering different ammoniated products—by preceding the change with a simple flushing procedure. They are equipped to handle the growing use of "one-trip" solutions; that is, the combined delivery trucks for dispensing petroleum products and insecticides, as well as liquid fertilizers with defoliating agents. An important consideration in the rotary all-ferrous meters is low meter upkeep. Costly metal-to-metal contact is eliminated; instead, minute liquid capillary seals form between the revolving rotor assembly and the stationary member. To assure proper installation, the compatability of the various insecticides and defoliating agents with all-ferrous construction should be positively known or checked with the meter manufacturer.

The rate of liquid flowing through the meter dictates size. For instance, depending upon the bulk or tank truck application for liquid fertilizers, meters with flow rates of from 20 to 800 gallons per minute are in use. In addition to accuracy, *repeatability* is another positive displacement metering property. The word "repeatability" is commonly used to denote the ability of a meter to repeat on pre-set volumes, an important consideration in processing and marketing applications. The repeatability of positive displacement meters is excellent; the rotary meter easily repeats to the fourth place (.0025).

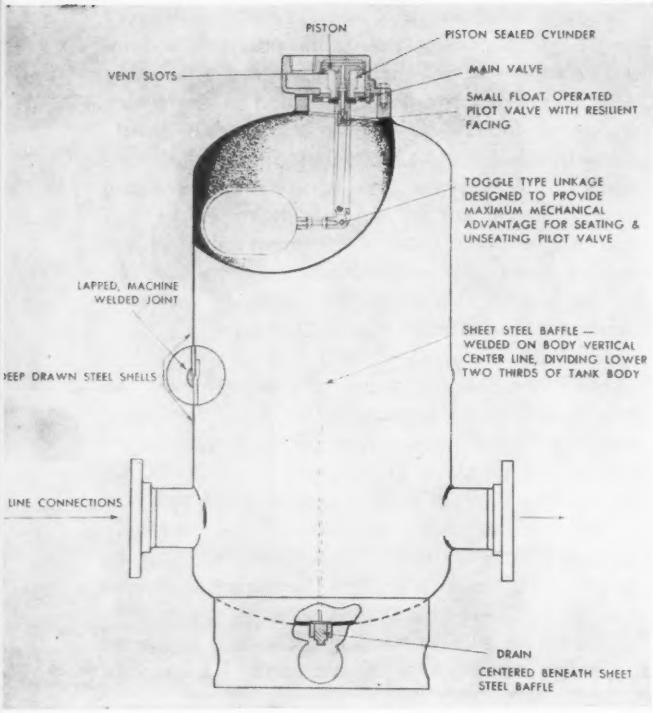
Metering System Installation

Strainers, air eliminators, back-pressure and rate limit valves are commonly considered part of the metering installation, in addition to the meter proper. In addition, liquid fertilizer systems often make use of two additional accessories: multi-stage quantity control valves to shut off flow automatically at a pre-determined volume, and temperature compensators, which insure registration of liquid volume automatically corrected to a specific base temperature.

Sometimes special accessories are used to "automate" the installation—for example, a register that rings a bell, buzzes a buzzer, lights a lamp, starts or stops pumps, indicates total flow remotely, or prints the flow to provide permanent records when certain quantities of liquid have been metered.

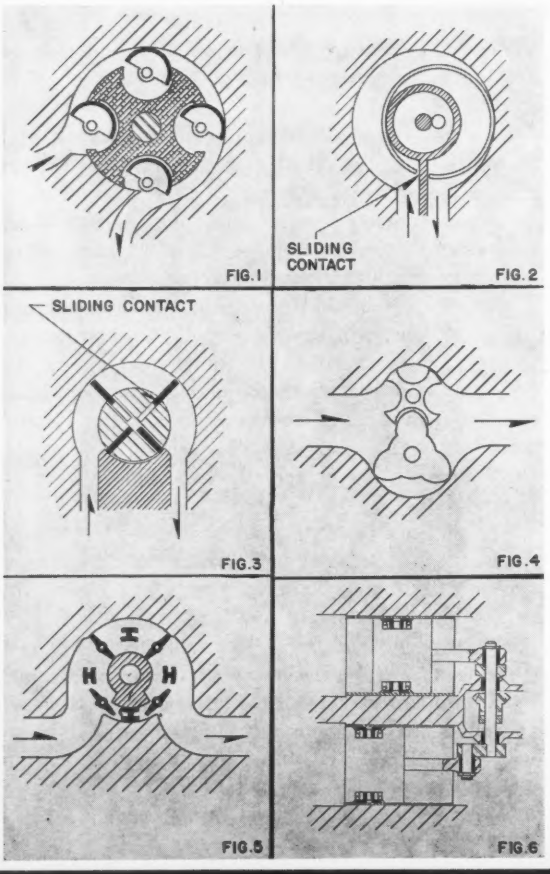
The strainer should be installed as near as possible to the inlet side of the meter. If it is impractical to install the strainer on the meter inlet, the piping between strainer and meter should be thoroughly cleaned before installing the meter in the system. This will prevent pipe scale, welding beads, etc. from entering the meter, which could cause malfunctioning.

The strainer basket should be cleaned frequently, since a loaded strainer will reduce the rate of flow through the meter. The frequency of cleaning depends upon the amount and size of dirt or foreign particles being transferred in the system. On new systems it may be necessary to clean the strainer more frequently, because welding scale and beads as well as dirt are commonly experienced.


PISTON
PISTON SEALED CYLINDER
VENT SLOTS
MAIN VALVE
SMALL FLOAT OPERATED PILOT VALVE WITH RESILIENT FACING
TOGGLE TYPE LINKAGE DESIGNED TO PROVIDE MAXIMUM MECHANICAL ADVANTAGE FOR SEATING & UNSEATING PILOT VALVE
LAPPED, MACHINE WELDED JOINT
SHEET STEEL BAFFLE — WELDED ON BODY VERTICAL CENTER LINE, DIVIDING LOWER TWO THIRDS OF TANK BODY
EEP DRAWN STEEL SHELLS
LINE CONNECTIONS
DRAIN
CENTERED BENEATH SHEET STEEL BAFFLE

Air eliminator. Installed adjacent to the meter, with the strainer separating it from the meter, the air eliminator separates air or vapor from liquid.

Typical types of positive displacement meters: (1) half-moon rotary, (2) oscillating piston, (3) sliding vane rotary, (4) two-spiral fluted rotor, (5) conventional vane rotary and (6) conventional piston.



Strainers are commonly designed to take less valuable space in the system and to make cleaning an easy task, as well as to simplify replacing an inexpensive basket.

An air eliminator is essential in many metering systems for the separation of air or vapor from the liquid. The passage of air or vapor through a meter will give false registration. The air eliminator should also be installed as close to the meter as possible. It should be adjacent to the meter, with the strainer separating the meter and air eliminator. The air vent line from the top of the air eliminator may be piped to the atmosphere; if liquid drippings are experienced from the air vent, the vent should be piped to an auxiliary tank or storage tank which is vented to atmosphere to collect the drippings.

Multistage quantity control valves, used in bulk and tank truck liquid fertilizer systems, consist of a multistage valve, latching devise and predetermining register. Closing automatically in three separate stages at a predetermined volume, the valve smooths out closing pressure and eliminates harmful hydraulic shock which can result from sudden shut-off.

Temperature compensators allow metered flow to be continuously recorded at the desired temperature point. A temperature bulb in the liquid stream senses temperature fluctuations which are transmitted by flexible tubing to a bellows on the meter head. Contraction and expansion of this bellows with temperature changes actuates the meter micro adjustment. This variable speed device regulates registration.

Post-Installation Procedure

After installing the metering equipment, all air should be purged from the system. The liquid and air should be allowed to proceed very slowly through the metering equipment until all air has been removed. This will prevent over speeding and shock to the meter. The air will over-speed the meter and shock will occur when solid liquid travelling at a high velocity enters the meter.

A positive displacement meter should not be operated beyond its rated capacity on any system unless approved by the manufacturer. The name plate on the meter clearly shows the rated capacity as well as the pressure rating. On some installations it may be necessary to retard slowly so as not to exceed the maximum rated capacity of the meter. Should this be necessary, the device for regulating the flow, usually a rate limit valve, must be installed on the discharge side of the meter. The rate limit valve is designed to efficiently and economically protect the meter from over-speeding on liquid, and the valve is usually controlled by the line pressure.

Trouble-Shooting the System

Because of the important role that a meter plays

in liquid fertilizer distribution systems, it is advisable to have a workable and active preventative maintenance program. The loss of the services of a meter may prove very expensive.

If a metering system fails to perform as designed, the natural tendency is to complain about the meter, and the common statement is usually "The meter is not measuring accurately." In the majority of cases the mal-performance of the meter is the result of misapplication, dirty system, improper sizing of auxiliary equipment, etc.

This is not to imply that meters will not fail or wear out. They will. But it is a good policy to assume the meter is giving good service and check other auxiliary equipment before checking the meter. The meter is a precision device and a lot of expense goes into the research, engineering, manufacturing and testing of each meter before it is delivered.

Possible meter difficulties include under-registration, over-registration, reduced rate of flow, complete stoppage of both meter and liquid flow, stoppage of meter registration but liquid still flowing.

Under-registration (the volume put through is greater than the amount recorded on the registering device) is the result of leakage around the sealing members of the measuring mechanism or of a faulty register. The leakage in most cases is caused by worn moving parts on meters with a service record. On new meters it could be caused by an extremely dry product or dirt build-up on moving parts which imposes a drag on the mechanism.

Over-registration (the volume put through is less than the amount recorded on the registering device) is not a frequent complaint but does happen on some installations. As previously mentioned, the air and vapors must be separated from the product to assure accurate registration. If air and vapor are present, over-registration will result. This could be caused by a faulty air eliminator, plugged air eliminator vent line, restrictions in the system causing vaporization of the product and a leak on the suction side of the pump, or by an erratic register or meter accuracy adjustment mechanism.

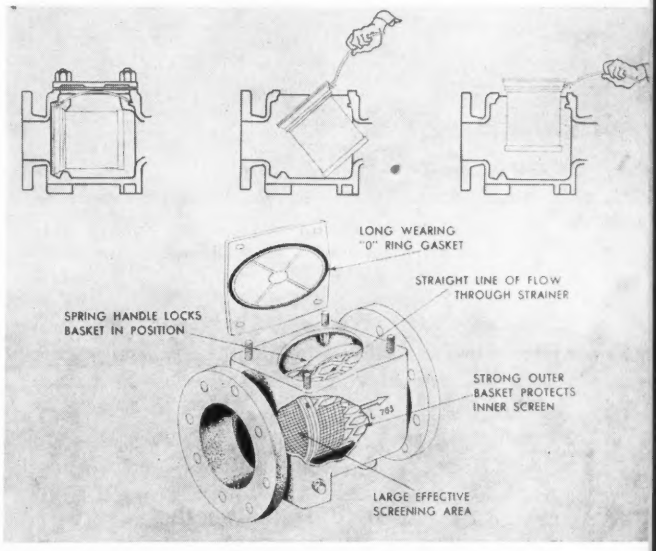
If the rate of flow reduces through the meter, check the system for restrictions: Open air eliminator vent, worn pump, badly worn meter or mechanical interference in the meter. The restriction could be a plugged strainer or pipe, partially closed valve, etc.

If complete stoppage of the meter and liquid is experienced, it is usually caused by a mechanical failure in the meter or pump. If the meter does not stop instantly but slowly, look for a faulty valve or a spot in the system for complete build-up of sediment. It is always a good policy to check supply volume.

Distributors may at some time experience liquid flowing through the meter but the register is not recording. If this happens, look for a broken shaft, gear or pin in gear trains of the meter and register.

Specialized Maintenance for Liquid Fertilizers

In addition to the standard maintenance procedures recommended for rotary positive displacement meters, special considerations should be observed for liquid fertilizers and other aqueous solutions. All interior parts of the meter must be flushed thoroughly with water or steam before changing from one type of solution to another. This will prevent precipitation of salts due to mixing various types of solutions. If it is found to be impossible to keep the interior of the meter wetted during inoperative periods, such as in tank truck installations, the meter should be flushed thoroughly with water,


LONG WEARING "O" RING GASKET
STRAIGHT LINE OF FLOW THROUGH STRAINER
SPRING HANDLE LOCKS BASKET IN POSITION
STRONG OUTER BASKET PROTECTS INNER SCREEN
LARGE EFFECTIVE SCREENING AREA

Line diagram of a strainer, an important part of meter installation. Strainers should be installed as near as possible to the inlet side of the meter.

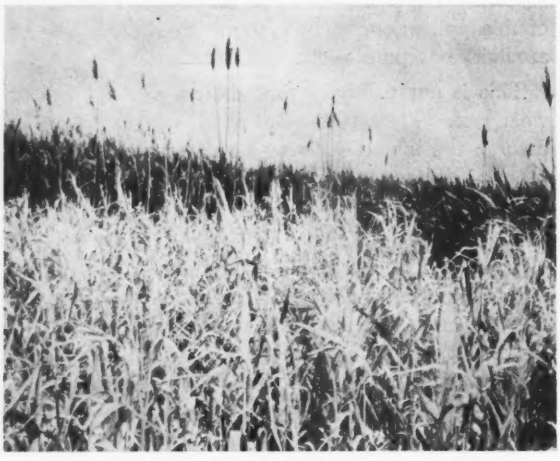
drained and flushed with a rust preventative oil before being allowed to stand idle.

Proper flushing of the meter requires (1) a shut-off valve, installed downstream from the meter; (2) a petcock, installed in the bottom of the line between the meter and the downstream shut-off valve; (3) a second petcock and fitting, inserted near the bottom of the meter rear cover; and (4) a petcock installed in front of the meter. With the downstream valve closed and the three petcocks open, the stream or hot water supply can be added upstream from the meter. This will allow the flushing medium to pass through the metering chamber and the meter end sections and escape through the petcock.

It is most important not to overspeed the meter while flushing. Flushing should be held to a speed approximately equivalent to the minimum (20 per cent) rated capacity of the meter. ▲

Herbicidal Effect of Amino

Typical effect of amino triazole on Canada thistle one week after spraying. Note the white new growth.



Phragmites were sprayed with amino triazole in Fall, 1954. Whitening of plant is characteristic of AT.

By B. L. Walworth
American Cyanamid Company

A discussion on this new systemic herbicide reveals how it works and its future possibilities

WHY HAS chemical weed control jumped from practically nothing to a multi-million pound business in the brief span of the past 12 years? The practice certainly isn't new. Chemical weed killers have been known and used for over 50 years. And weeds certainly aren't new. As agriculture has become more and more intensive over this 50 year period, the weed problem has also become intensified. By USDA estimates, weeds now cost farmers over $2,250,000,000 every season.

The chief reason that chemical weed control took so long to become established was the lack of specificity and effectiveness of the chemicals that were available. It took the introduction of 2,4-D in 1942 to convince growers that the benefits of weed killers were vast and profitable.

When the almost miraculous killing-effect of 2,4-D became apparent, sales of the material started booming. The total has now reached upwards of 30 million pounds a year. But, even more important, the success of 2,4-D stimulated a tremendous push in herbicide research. The results of this research—today's new specific-use weed killers—have also made phenomenal growth, and are now eliminating work and economic loss on practically every crop in the country.

One of the newest of the new is amino triazole. In addition to being a specific herbicide, amino triazole possesses a valuable additional property—it has a systemic type action, i.e., it is translocated

Triazole

Same area as shown in center one year later, in the Fall of 1955, with the Phragmites completely killed.

readily throughout the plant to kill both roots and top growth. Results are often spectacular. The new growth of many species treated with amino triazole is completely white because the herbicide inhibits the production of chlorophyll.

Amino triazole controls many species of grassy and broadleafed herbaceous weeds and woody plants, yet it shows a marked degree of selectivity within groups—especially in woody plants. The fact that it's highly effective against hard to kill perennials like Canada thistle, poison ivy, quack grass, and ditch-bank water weeds solves many, heretofore tough, problems. Another interesting point is that amino triazole leaves no sterilizing residues. This makes early cropping possible after treatment—completely eliminating one of the detrimental factors which has limited the usefulness of 2,4-D and many other herbicides.

Amino triazole is formulated as a white powder. The material is readily soluble in water and, unlike persistent 2,4-D, can be easily flushed from spray tanks with plain water. When sprayed on the foliage of plants, amino triazole diffuses into the leaves and is translocated quite generally throughout the plant from growing point to roots, particularly to undifferentiated tissue.

New growth of most herbaceous species—for example Canada thistle or quack grass—starts to show a lack of chlorophyll within a few days. The foliage turns white to pinkish-white in color. Then, if amino triazole has been applied in the recommended concentration, the plant dies gradually.

Poison ivy, on the other hand, rarely shows any white growth. Instead the treated leaves become limp several days after treatment and are brown and dead a few weeks later. A delayed and very different reaction typical of many woody species is seen on white ash. The plant or its foliage may not show any effects for the remainder of the season after the spraying. The following spring, however, it brings forth small white leaves which soon dry up and die. Such plants have borne and dropped 2 and even 3 sets of white leaves before growth ceased.

Probably the worst weed throughout the Middle West is Canada thistle. On this pest amino triazole has already shown more than just real promise. Being a one-application chemical that does not take the land out of production, it has provided control of this rugged pest never before possible.

Researchers in Indiana, Illinois, Ohio and other Mid-western states over the past four years have found that Canada thistle can be controlled by spraying the thistles in the spring when they are 4 to 10 inches tall (preferably in the bud stage) with 4 to 6 pounds of amino triazole per acre. The plants continue to grow for a short time. The new growth, which lacks chlorophyll, gives the appearance of green plants with albino tops. Growth soon ceases and the above ground part of the plant dies. In the meantime the amino triazole is translocated throughout the plant, especially to the rhizomes. These underground propagation factories collect amino triazole and new shoots from the affected tissue—if they grow at all—are white, and dying.

If the land is to be plowed or otherwise prepared after thistle treatment, it's best to wait at least 2 weeks to gain full benefit from the systemic action of amino triazole against underground buds.

Canada thistle can also be controlled after crop harvest by spraying in late summer or fall. Under these circumstances, better results have been obtained when the old thistles were mowed or plowed under, and the active regrowth allowed to reach a height of 4 to 10 inches before spraying.

With either spring or late season sprays, a high degree of permanent control has been obtained. However, a plant here and there may escape, or a few new seedlings may appear from seed that has blown in. These can be readily killed by follow-up spot spraying.

Quack grass, considered by many weed control specialists to be the worst weed pest across the Northeastern United States and Canada, has also succumbed to amino triazole. The best attack is a one-two punch. First comes a spray with amino triazole and then tillage completes the knockout. Dr. S. M. Raleigh of Pennsylvania State University says, "We controlled about 99 per cent of the quack

grass in experimental fields last year with a combination of amino triazole and tillage. These results followed spring application directly on sod; after the quack grass turned white or very light green, the sod was plowed, disced and planted to corn immediately. The corn was cultivated several times."

Good news for farmers and homeowners alike is the discovery that poison ivy is especially susceptible to amino triazole. As little as one pound per acre has given complete control. A recent and striking example was the use of amino triazole in the 2,030 acre park at historic Valley Forge, in preparation for next year's National Boy Scout Jamboree. An estimated 700 acres of poison ivy was eradicated with a single application of the new chemical.

Almost 500,000 acres of power transmission lines have been chemically treated this year for woody brush control, and a tremendous job still remains to be done. Here too, amino triazole is finding its place. And again its forte is the control of species that are difficult to kill with 2,4-D and 2,4,5-T, for example; black locust and chestnut oak.

A great many woody plants are susceptible to amino triazole, but considerable specificity exhists among the various species. The following table shows woody species that are known to be susceptible or resistant to amino triazole.

Susceptible	Resistant
White ash	Blueberry
Wild black cherry	Cranberry
Mockernut hickory	Sassafras
Black oak	Smooth sumac
Northern pin oak	Red maple
Red oak	Sweet fern
Scrub oak	Viburnum
White oak	Hawthorn
Chestnut oak	Elderberry
Poison oak	Horse chestnut
Black locust	Quacking aspen

The natural resistance of some woody cultivated plants to amino triazole is causing many growers of such types of plants to take a new look at weed control. For example, amino triazole on cranberries is close to becoming an accepted practice. The only phytotoxicity to the crop observed so far is a temporary pinkish-white leaf discoloration that lasts approximately two weeks. More data is being gathered, and in the near future definite rates for control of various weeds in cranberries may be established.

Amino triazole is also effective on such ditch bank and swamp weeds as tules, cattails and phragmites. Workers in California sprayed tules and cattails at the heading-out stage with 15 to 20 pounds of amino triazole in sufficient water to thoroughly wet all foliage. In about a week the sprayed plants began to look white because of the inhibition of chlorophyll. The plants lost more and more of their green color and in a month the tops of the plants were completely dead. Several months later underground portions of the plants were dug and found to be dead and decomposing.

In the East, phragmites, (another member of the reed family) has met much the same fate. Drenching sprays applied at the heading out stage showed about 95 per cent control the following spring. Applications at earlier stages of growth have been less effective.

The most recent weed problem on which amino triazole shows marked promise is the control of weeds on fallow land. Several million acres are fallowed each year in the west. Amino triazole at 2 lbs. per acre was applied by air to about 200 acres of fallow ground on which weed growth had become excessive. The control was nearly 100 per cent and covered a dozen or more species of weeds.

Amino triazole has been registered under federal requirements of the Miller Bill for non-crop uses. However, intensive studies employing the most modern chemical, chromatographic, radioactive tracer, and biochemical techniques, together with a thorough investigation of mammalian toxicology, have been in progress for some time. The purpose of these studies is to determine the fate of the compound after application and possible residue hazards to man and animals. This work remains to be completed, but there is sound reason to believe that it will be possible to apply amino triazole for weed control in growing crops without fear of harmful residues being present on or in the crop at harvest. It is hoped that additional registered uses will be available for the next growing season.

One cultivated crop on which the unique properties of amino triazole can already be utilized is cotton. Amino triazole is the only compound that both defoliates and inhibits regrowth of the plant after defoliation. Good results have been obtained when 3·A·T.* amino triazole was used alone or in combination with half the recommended amount of other commercial defoliants. The growth inhibition properties of amino triazole, which keep the regrowth in check for 3 to 5 weeks, permit mechanical harvesters to bring in less trashy and more stain-free lint.

Amino triazole is still new. Its versatility as an herbacide and a defoliant is by no means fully explored. Its yet-to-be-explained interference with plant growth has prompted many plant physiologists to view it as a new tool in their basic studies.

But the immediate reason that weed specialists from coast to coast are testing this chemical-alone and in combination with other herbicides-is its effectiveness against the many deep rooted annuals and perennials previously referred to. Amino triazole has already established itself as a useful and useable herbicide. ▲

* Trademark of the American Cyanamid Company.

Chemical Specialties Manufacturers Assn. Meeting: Insecticide Div.

Harry E. Peterson

THE Mayflower Hotel was the site of the 43rd annual meeting of the Chemical Specialties Manufacturers Association, December 3-5, in Washington, D. C.

During the proceedings, association members elected Harry E. Peterson, president of Peterson Filling and Packaging Co., Danville, Illinios, president of CSMA. He succeeds Dr. Emil G. Klarmann of Lehn & Fink Products Co., New York City.

Additional officers named by the trade association during its general business session were: First vice president—J. E. Ferris, Hooker Electrochemical Co.; second vice president—D. M. King, Masury Young Co. Elected for the 10th consecutive time as treasurer was P. C. Rielly of Rielly Tar and Chemical Corp., and renamed as secretary was H. W. Hamilton, who has held the post since 1951.

Named to the association Board of Governors were Dr. E. G. Klarmann retiring president, along with A. E. Dudner of S. C. Johnson & Son, Inc., and R. G. Puhle, Borden Co.

During the meeting the aerosol industries packaging contest took place. Under the insecticide products category, Avon Products, Inc., maker of "Avon Mothproofer" was the winner.

Highlighting some of the talks given during the meetings of the Insecticide Division were presentations by V. C. Dethier, John Hopkins University, "Attractants and Repellants"; G. S. Kido, Wisconsin Research Foundation, "Some Aspects of Commerical Insecticide Testing." Others included were a discussion of "Answers to Labeling, Regulatory and Toxicological Problems with Insecticides."

In his address, Retiring President E. G. Klarmann discussed the progress made by the association and its various divisions. "In the insecticide field there has been considerable expansion notably in pressure package products. New preparations entered the market with extensive publicity campaigns making the public better aware of the importance to public health of controlling insect pests. New chemicals have also made their appearance, such as Dieldrin for roach control, Strobane and Perthane for moth control; roaches resistant to other insecticides appear to yield to Malathion.

"Only a passing reference can be made at this point to the important scientific accomplishments of the several committees of the CSMA's Insecticide Division, particularly in the area of testing methods, such as those for insecticidal aerosols, for cockroach insecticides, for the chemical analysis of insecticidal agents and others. And while on the subject of the Insecticide Division, one should not forget the extremely valuable work on industry surveys, nor on the updating of the commercial standard for the insecticides."

Continuing, Klarmann discussed a subject important to all divisions of the Association—mainly the services rendered by the Precautionary Labeling Committee.

"This committee offers carefully considered advice as to the needs for warning or cautionary statements which should appear on labels of certain chemical specialities manufactured by members of this association. The activity of the Precautionary Labeling Committee actually keeps gaining in significance owing to the increasing publicity accorded to accidents resulting from the ingestion of different chemicals, especially by children. While some of these reports choose to sound the note of sensationalism, others take a more rational view of the problem, which considers the team approach to its solution, involving its medicolegal, regulatory as well as educational aspects."

Covering this area Dr. Klarmann noted it is "in this connection that your Precautionary Labeling Committee has established a liaison with the Committee on Toxicology of the American Medical Association, particulary with respect to new legislation in which the AMA is interested as a means of reducing the hazards of chemical poisoning." ▲

ICC Freight Decision

By John Harms

WHAT would a general across-the-board increase of 22 per cent with no "holddowns" for fertilizer materials mean to the industry, particularly to the larger producer who must move materials in heavy volume over long distances?

The question is also a serious one for everybody in the industry down to the local distributor and the farmer who buys the final product.

Make no mistake about it. The question is not entirely hypothetical. Contradicting Interstate Commerce Commission claims to the contrary, the Eastern and Western railroads have made it plain they have asked for two separate increases, one of seven per cent and one 15 per cent. Even in gobbledegook, that totals 22 per cent. Southern railroads are automatically drawn into the petition through the form in which it was filed which also called for a "general investigation" of all freight rates.

Behind industry concern over the effect of the current petitions for even higher freight rates is the following observation. Counting from late 1946, ICC has approved increases totalling 89.9 per cent. These were decided in a series of 13 separate increases, or an average of more than one a year. Eight of the 13 were "interim" or down-payments on five general increases asked for but not finally approved.

This is why Washington Government and trade traffic experts with a pipeline into the Commission regard the question of how far it will go in attempting to grant the full 22 per cent as far from theoretical. If less than 22 per cent, a final grant of 15 or 17 per cent would have just as disastrous an effect upon the marketing costs and price and, hence, demand, according to marketing analysts.

Eastern Roads Get 7 per cent

ICC in December granted the 7 per cent increase, for Eastern RR with "holdbacks" for some commodities, including potash and phosphate rock. At the point where 7 per cent of a rate is more than 50 cents a ton for potash, the holdback applies. For phosphate rock, the holdback applies where 7 per cent is more than 30 cents. This lightens the burden for the longhaul materials. ICC held down western railroads requests to a 5 per cent increase with the same hold downs that apply to eastern railroads. This is a 2 per cent benefit for long haul fertilizer materials over the general 7 per cent granted. The decision on the southern railroads petitions will come later.

This was a general 3 per cent more than former USDA traffic attorney, Walter Matson and Dr. Wm. Stevens, former chief of ICC's Bureau of Transport Economics, agreed was necessary to offset actual increases to the railroads in operating costs. Testifying for the Plant Food Institute, the two experts held 4 per cent was maximum.

Higher Prices May Hurt Sales

Despite the holdbacks granted, the 7 per cent increase will force the industry to tighten its belt at the point where the materials are reshipped in fertilizer form. Best industry and USDA estimates of fertilizer cost show that fertilizer now is in about as tight a cost-price squeeze as it can stand. Any further increase in costs mean higher prices that may affect fertilizer sales.

Showing how important this is, of major cost items now going into farm production, fertilizer showed prices lower in 1956 than in the previous year. As all farmers other costs are scheduled to be even higher in 1957, fertilizer was in a fair way to becoming an even better buy.

As USDA economists see it, "Prices paid (by farmers) for fertilizer per pound of plant nutrients may continue to decline. Upward trends in plant nutrient content of fertilizers and in bulk handling are expected to continue. The favorable cost position of fertilizers relative to that of other production costs

is expected to continue for the next few years. There are some indications that fertilizer may compete with other inputs for the farmers' available operating funds even more strongly than at present."

You may get an idea of how little fertilizer costs have gone up in comparison with other farm costs by comparing the USDA official figures for 1956 with 1947-49:

	Percent change
Fertilizer prices	up 6
Farm real estate taxes	up 56
Farm real estate prices	up 40
Farm machinery prices	up 40
Motor vehicle prices	up 31
Farm wage rates	up 28
Building & fencing materials	up 28
Motor supply prices	up 20
Farm supply prices	up 17
Farm-mortgage interest rates	up 10
Seed prices	down 10
Feed prices	down 11
Feeder livestock prices	down 22

Transportation rates by comparison, however, have gone up 89.9 per cent in the same period.

Further factors which, in conjunction with higher freight rates, are likely to govern fertilizer demand are expected to operate for at least another three to five years. These are competition for the supply of labor, and steel used to produce farm implements.

Farm Prices Remain Steady

At the same time, farm income is expected to continue at no higher than the current reduced levels. Except for seasonal and unusual ups and downs, no general increase in farm prices is expected. In the meantime, the burden of bolstering farm prices will increasingly fall on the Federal Government which at the moment appears to be going all out to use lower prices and the Soil Bank to control production and achieve higher prices. Lower prices so far have not succeeded in curbing production. Although the Soil Bank is due to add five per cent to farm income in 1957, already there is speculation this might be offset by higher costs.

Barring unexpected changes, it is against this background that increases in freight rates must be viewed. Fertilizer and National Plant Institute witnesses in the recent hearings on the petition for the 7 per cent increase showed in cost figures that the farmer would have to pay eventually for the additional freight rates.

This points the finger to what is certainly more than just a $64,000 question for the industry. At what point does higher price result in falling consumption of fertilizer? And granting the effect of the 7 per cent increase can be cushioned, somehow, what would be the effect of further freight rate increases?

A better test of the effect might be to start at the top. Apply the full 22 per cent increase asked for to a representative rate for a long haul for potash from New Mexico to Buffalo. At $16.48 per ton including tax, such an increase would bring the rate up to over $20 per ton. At about 50 tons, the increase per car would be about $200.

Or take phosphate rock, at a rate of $10.45 per ton including tax from Florida to Buffalo. The ton rate increased by 22 per cent would be about $12.75 plus tax. Per car, the increase would be a serious one to try to absorb.

ICC Sets Deadline

ICC has set February 1 as deadline for the filing of statements by shippers and others who will have to pay the freight. Oral hearings in Washington are scheduled for February 25. Opportunity for cross-examination will be presented on March 6.

All this means ICC is acting fast. Whatever the outcome, the industry will have to start taking the possibilities into account in preparing for the next marketing year. The experts are agreed it is a time to take serious stock.

At publication time, additional moves for still higher freight rate increases were in the wind according to railroad sources. These were to carry out an earlier unofficial declaration that a petition for another 5 per cent increase would be filed about the time higher prices go into effect for steel.

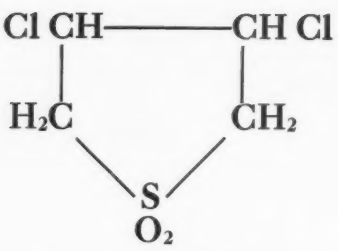
Fertilizer industry witnesses before ICC in the 7 per cent proceedings readily granted that wage and material cost increases have recently cut into railroad revenue. Industry witnesses also showed no inclination to oppose fair increases to cover rail losses, plus holddowns for fertilizer materials.

The industry witnesses, however, also showed official statistics of the Association of American Railroads reporting that total rail operating expenses —meaning cost per 1000 gross ton-miles—have gone up nowhere in proportion to the cost increases.

For example, official AAR statistics showed the cost of materials and supplies up only 4 cents per 1000 ton-miles in 1955 as compared with 1949, although it was down 11 cents in 1950 and up 12 cents in 1953 in relation to 1955.

One ruling on procedure by the ICC already has shippers up in arms. Opponents are limited to filing affidavits, oral testimony, and cross-examination of railroad attorneys to the extent they are willing to give answers. ICC turned thumbs down on public hearings that might result in publicity. As Master Herschel Newsom of the National Grange put it, the ICC "won't even let Department of Agriculture transportation experts testify." (in person). ▲

PRD . . . A New Experimental Nematocide



3,4-dichlorotetrahydro-thiophene 1,1-dioxide

PRD is a newly-found experimental nematocide developed through cooperative research by Diamond Alkali Co. and Boyce Thompson Institute. On the basis of intensive experimental work over the past two years, the compound has recently been made available for additional testing.

A white, crystalline solid of low vapor pressure, the chemical has little odor and is soluble in various solvents. It is estimated to be no more hazardous than present day commercial pesticides.

In comparison tests, PRD was evaluated under greenhouse conditions against root-knot nematode. Average results of several tests are shown in the following table:

Dosage Lbs/Acre Active Ingredient	PRD	Vapam	Nemagon	VC-13	D-D
512	—	—	—	2	1
256	—	—	—	8	2
128	—	—	—	9	—
64	—	—	—	10	—
32	1	1	3	—	—
16	3	5	8	—	—
8	8	9	10	—	—

(Nematocidal rating based on scale of 9–10 where 0 equals complete controls and 10 represents no control as in untreated checks)

In small plot tests, PRD was incorporated in the top three inches while the other tested materials were added at a depth of 8 inches by injection. In all cases, the materials were used at a rate of 80 pounds active ingredient per acre.

Effect on Nematode Populations of Nematocides

Test Material	Total nematode count from four 80 gm samples taken from replicated plots at four soil depths				
	0-3 in.	3-6 in.	6-9 in.	9-12 in.	Total
PRD	100	900	900	900	2,800
Nemagon	2,600	700	500	300	4,100
D-D	3,300	1,100	900	1,300	6,600
Vapam	4,700	1,500	1,200	600	6,100*
Control	2,800	2,100	1,600	900	7,400

* Based on assumption that 0-3 in. reading for Vapam was abnormally high compared to control.

Further testing showed that PRD does not exhibit systemic properties as a nematocide, nor does it have the ability to kill root-knot nematodes in living infested roots. Root-knot eggs or cysts of the Golden Nematode were not affected by this chemical. Tests indicated PRD possesses outstanding nematocidal activity and that it appears to function as a contact nematocide against free-living forms.

Where seeds were sown immediately after soil treatments at the rate of 40 pounds of active PRD per acre, reduction in germination and significant inhibition in growth of such crops as corn, cotton, soybeans, oats and cucumbers occurred. Present information, based on field and laboratory studies, indicates that at least 30 days should elapse between treatment and planting. More data are needed to determine the exact time interval between treatment and planting of crops under a variety of environmental conditions.

PRD moves downward in the soil with rainfall so that maximum concentration occurs at 3 to 4 inches below the surface after one to two inches of rain in sandy loam soil. Continued rainfall without drying tends to move PRD to greater depths.

At the present time, experimental work with the chemical indicates a rate of 40 pounds of active PRD per acre. This is based on effective control of nematodes and favorable plant tolerances. ▲

Wheeler

Wheeler, Neff Talks Heard, Baker Elected Pres. at 33rd

CFA CONVENTION

Neff

ABOUT 500 persons from this country and Canada assembled at the Del Coronado Hotel, Coronado, Calif., November 11–13, for the 33rd annual convention of the California Fertilizer Association and saw Jack Baker, Bandini Fertilizer Co., elected president of the group for the coming year.

Serving with him are W. G. Hewitt, Berkeley, vice president; M. M. Stockman, San Francisco, secretary; Howard H. Hawkins, Glendora, treasurer; and Sidney H. Bierly, San Marino, general manager. Newly elected directors for three-year terms are Baker; Lowell W. Berry, Oakland; V. A. Frizzell, Salinas; and Earl R. Mog, Stockton. John C. Anderson, Bakersfield, and John N. Williams, Chula Vista, were elected to the board for one year terms, and Arthur W. Mohr, Richmond, for a two-year term.

"Wheelerpoints" Described

Elmer Wheeler, Dallas, Tex., sales promotion expert, told delegates of the following five keys to successful salesmanship, which he called "Wheelerpoints."

1. "*Don't sell the steak, sell the sizzle.*" Wheeler said that hidden in whatever is offered for sale are features which have human appeal often overlooked in their presentation to the prospective purchaser, which he called "invisible sizzles."

2. "*Don't write, telegraph.*" The first ten words will make or break a sale, he said. If they aren't the right words, the next 10,000 will remain unheard.

3. "*Say it with flowers.*" Sprinkle the sales talk with showmanship, for "the telegram all by itself isn't half as impressive as when the Western Union boy hands the lady the flowers," said Wheeler.

4. "*Don't ask if—ask which.*" When on the point of closing a sale, he said to always give the other person a choice between "something" and "something else," never just something alone.

5. "*Watch your bark.*" The tone of voice reaches out to the heart while the words themselves are touching the brain of the prospect. He advocated backing up words with smiles or "smile tones."

The importance of their knowledge of the future in the conduct of their own businesses was explained to the group by Dr. Philip Neff, director, Industrial and Governmental Economics Research, Planning Research Corp. He pointed out that the capital requirements in the fertilizer industry are unusually high, and that it is impossible for a firm to rapidly adjust its plant size to market conditions.

Adjusting to Changing Conditions

Differential capital equipment and associated differences in technology have a tremendous effect in the operating experience of fertilizer producers, he reported. Technology is changing rapidly in this industry, which makes it necessary for producers to constantly adapt themselves to changing markets and changing methods. Those who fail to make proper adaptation will ultimately fail, while those who adapt themselves best to these changing conditions, and even anticipate them, will be most successful, he said.

M. E. McCollam, American Potash Institute, and chairman of CFA's Soil Improvement Committee, outlined the program of the committee during 1956 and as projected for 1957.

A most interesting discussion developed during a panel program on "Some Aspects of Fertilizer Industry Economics," which was the theme of the meeting. Moderated by Dr. J. E. Knott, chairman, Department of Vegetable Crops, University of California, the panel included George Monkhouse, Shell Chemical Corp.; Ned Lewis, Wilbur-Ellis Co.; J. Earl Coke, vice president, Bank of America, and Dr. Neff.

Concensus was that established mixers and distributors, together with their plants and storage facilities, should be utilized to the fullest by those who manufacture fertilizer materials to insure their most efficient marketing. The alternative would be to ignore the years of community background of these people, their knowledge of soils, crops, credit risks, etc., and establish at some expense duplicate distribution facilities, which would take years to develop the same degree of effectiveness.

Among the sponsors of cocktail hours and dinners during the convention were Stauffer Chemical Co. and Western Phosphates, Inc.; Shell Chemical Corp.; Balfour, Guthrie & Co. and American Potash & Chemical Corp. Atkins, Kroll & Co. furnished the printed convention program. ▲

Equipment & Supplies

A&S Installs New Equipt. for Step-Flex

New machinery for manufacturing their stepped-end bag has been placed in operation at Arkell & Smiths' Wellsburg, W. Va., plant.

Called the Step-Flex, the bag is now offered with either three or four walls at the same price as similar pasted bags, the firm reports. Pressure-glued stepped end at both top and bottom forms a squared-off type construction that facilitates handling, shipping and stacking. Further advantages claimed are less breakage and sifting and improved appearance.

For further information on the Step-Flex,

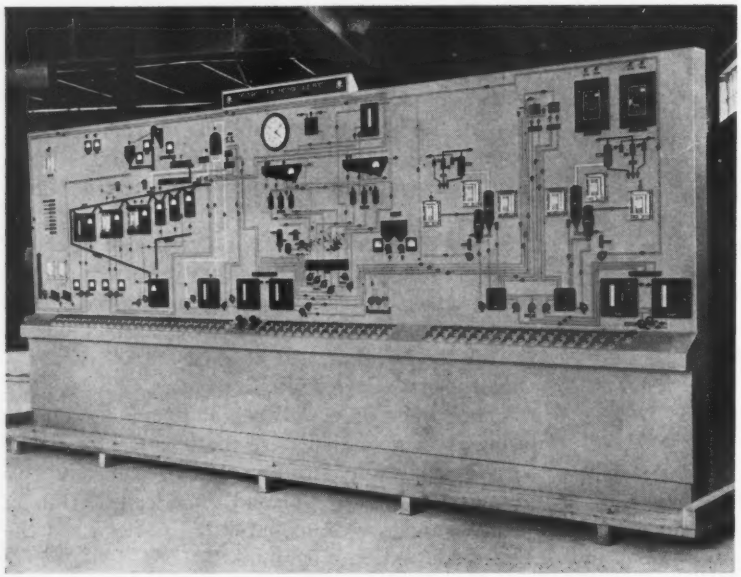
Circle 26 on Service Card

Fertilizer Plant Instrumentation

The instrument control panel illustrated below is to be installed in a Dorr-Oliver designed phosphoric acid plant now under construction for a Norwegian fertilizer manufacturer. Each equipment unit in plant flowsheet is represented on panel by silhouette cut to both scale and shape of operating unit.

Wherever possible, instruments indicating unit operating conditions have been located within corresponding equipment silhouette. The panel, 8 ft. long and 7 ft. high, was built by Regent Controls, Inc., Stamford, Conn.

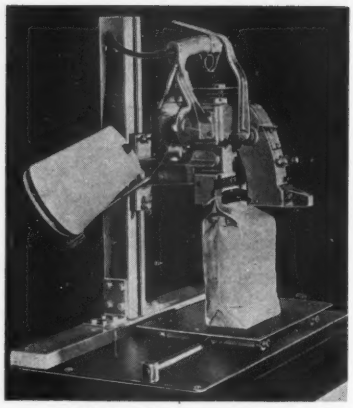
Control Panel for Norwegian phosphoric acid plant



FS Table Model Carriage Conveyor

Dave Fischbein Co. has just introduced a new table model carriage conveyor, Model FS, for closing smaller bags with the Fischbein portable bag closer.

The portable bag closer is locked into proper position on the carriage conveyor unit by turning one knob and can instantly be removed at any time for use elsewhere. The operator guides the bag through the sewing operation which is controlled by a foot switch. Carriage glides on precision ball-bearing rollers and returns automatically to starting position, ready for the next bag. For further details,

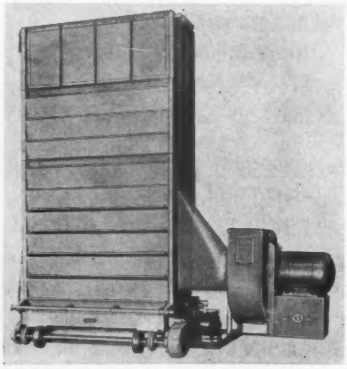


FS Carriage Conveyor

Circle 27 on Service Card

New Pellet Cooler From Sprout-Waldron

Sprout-Waldron & Co. reports that its new pellet cooler and dryer features automatic pellet flow control and hinged louvers for automatic air flow control.



Sprout-Waldron Pellet Cooler

This newest "coolaire" unit is said to be an extremely simple but most effective unit for cooling and drying pellets automatically, quickly, efficiently with a minimum of fines or dust leakage.

The unit has an all-steel base with stainless steel used on all parts which come in contact with moisture laden air.

For complete specifications and construction details,

Circle 28 on Service Card

New Shipping Carton Gives Double Duty

A new style shipping carton which doubles as a retail display is reported to be increasing the sale of cattle insecticides for Farnam Companies.

Designed and produced by Hinde & Dauch, the shipper holds four 1-gallon cans of livestock spray, converts quickly to a colorful display unit with eye-catching

fold-up panels that carry a printed message designed to attract potential customers at the point-of-sale. For more information on the H&D box,

Circle 29 on Service Card

Bristol Remote Positioning System

A new remote positioning system for transmitting motion with appropriate output power has been developed by Bristol Co. Its three basic components are: transmitter, amplifier and receiver.

Accuracy of the system is said to be independent of load, since the receiver motor gets full voltage for any error signal exceeding the deadband, which can be as low as 0.2 per cent of scale. Manual over-ride, inching control and interlock features are available as options. For additional information,

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Closing date: 10th of preceding month

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FOR SALE: 3—Sprout Waldron size 12, style B horizontal ribbon mixers, 336 cu. ft. (10/12,000#) working capacity. Perry Equipment Corp., 1430 N. 6th St., Phila. 22, Pa.

FOR SALE: Aluminum 5 compartment Tanks 2700–3000 gal. formerly used as truck tanks. Oval shape. Perry Equipment Corp., 1430 N. 6th St., Phila. 22, Pa.

HELP WANTED

FERTILIZER SALES REPRESENTATIVE: Man with agronomy background especially adapted to golf course turf and green house growers to travel middle Atlantic states and midwest. Salary, car and expenses allowed. Send educational background and all particulars together with a non-returnable photograph in first letter. Reply to "570", care FARM CHEMICALS, Philadelphia 7, Pa.

SALESMAN WANTED: To sell high analysis granular complete fertilizers in Mid-South Region. Agricultural background preferred, successful fertilizer sales experience essential. State training, experience, give references. Address "575," Care FARM CHEMICALS, 317 N. Broad St., Philadelphia 7, Pa.

A NUMBER OF OPENINGS are available in our Agricultural Chemical Technical Sales Service Department, working with fertilizer manufacturers. B.S. degree in chemistry, chemical engineering, agriculture or agronomy required. Experience in fertilizer or allied industries desirable. Excellent growth opportunities.
Mr. P. W. Bauman, Monsanto Chemical Co., 710 No. 12 Blvd., St. Louis 1, Mo.

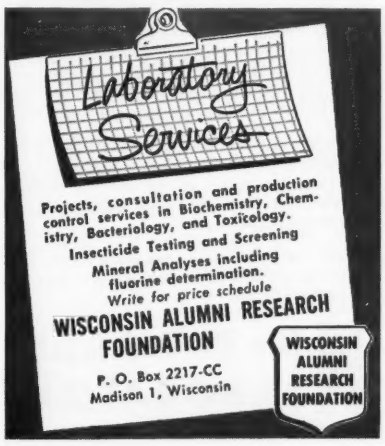
Suppliers' Briefs

Baughman Mfg. Co., Inc. Pierre Decrouez has been named Latin America sales and development engineer.

The Frank G. Hough Co. Robert L. Knox and Herman R. Brown have been appointed assistant sales mgrs. Madison L. Crawford, adv. mgr., recently announced appointment of Robert D. Schwartz as an assistant.

Kraft Bag Corp. New eastern sales manager is Ed Burgers, Jr., former sales promotion manager. Ted Belfit has been named sales representative in Pa., N. J. and Metropolitan N. Y.

Link-Belt Co. will build a new plant in Montebello, Calif. to replace and expand its Los Angeles facilities.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WISCONSIN ALUMNI RESEARCH FOUNDATION

by Dr. Melvin Nord

PATENT REVIEWS

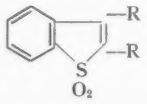
Defoliating Cotton And Soybean Plants

U. S. 2,760,854, issued Aug. 28, 1956 to William A. La Lande, Jr., assigned to The Pennsylvania Salt Mfg. Co., discloses the use of water-soluble chromates and dichromates as defoliants, especially for the defoliation of cotton and soybean plants.

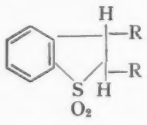
This type of defoliant is non-phytocidal, i.e. it causes no noticeable injury to the plants except leaf abscission.

New Class of Fungicidal Agents

U. S. 2,758,955, issued Aug. 14, 1956 to Oscar H. Johnson, Allan M. Harvey and Harry West, and assigned to Food Machinery and Chemical Corp., describes a new class of fungicidal agents, which are derivatives of thianaphthene-1-dioxide. The compounds have the formula



or

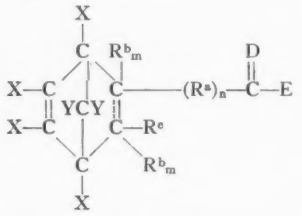


where R is hydrogen, chlorine or bromine.

Plant Growth Regul. Patent Assigned Shell

U. S. 2,758,918, issued Aug. 14, 1956 to Samuel B. Soloway and Juan G. Morales, assigned to Shell Development Co., describes a new chemical type of plant growth regulant. This regulant differs from the ones previously known, in that instead of inducing cellular elongation of the shoots of growing plants, it tends to supress cell elongation. It tends to induce defoliation of the plant, instead of inhibiting it; and it tends to suppress the development or growth of roots instead of promoting it. Thus, it exhibits what may be called an anti-auxin effect.

The compounds disclosed have the general formula



where X is a halogen, each Y is hydrogen or halogen; R^a is alkylene (C1-3) or the same substituted with hydroxy or halogen; each R^b and R^c is hydrogen or alkyl (C 1-4); D is O or NH; E is hydroxy, alkoxy, aminoalkoxy, metalloxy, aryloxy or amino; n is zero or one, and both m's are either zero or one.

Soil Conditioning

U. S. 2,759,902, issued Aug. 21, 1956 to Finn Claudi-Magnussen and Anthony James Martinelli, assigned to General Aniline & Film Corp., describes a soil conditioning mixture containing rosin or calcium resinate, and a copolymer of vinyl ester or alkyl vinyl ether and maleic anhydride.

According to the inventors, this mixture is cheaper than currently available soil conditioners, and the aggregates formed do not break down after a prolonged period of time.

Improvement In Soil Structure

U. S. 2,760,308, issued Aug. 28, 1956 to Robert Earl Emond, assigned to Esso Research & Engineering Co., relates to an improvement in soil structure caused by incorporating in a heavy clay soil up to 25 per cent by volume of calcined spent clay after use in refining lubricating

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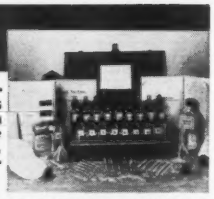

Everything necessary to make tests for 15 plant growth factors; plus tissue tests for Nitrates, Phosphorus and Potassium.

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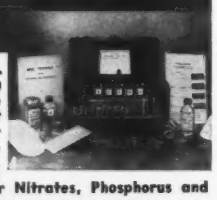

Everything necessary to make 100 to 300 tests for the following plant growth factors: Nitrates, Phosphorus, Potassium, Calcium, Ammonium, Acidity; plus tissue tests for Potassium.

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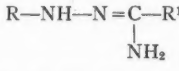
oils and petroleum distillates. The soil structure is so changed that it becomes more workable, porous, easily drained and warmer.

Composition to Combat Agricultural Pests

U. S. 2,758,050, issued Aug. 7, 1956 to Johannes T. Hackmann and assigned to Shell Development Co., describes a composition for combatting agricultural pests, including fungi and bacteria. It has been found that aromatic hydrazines having the formula given below are especially effective in this respect



where R is an aryl or aralkyl radical (up to C_9), and R^1 is the residue of an organic carboxylic acid or of hydrocyanic acid. Preferably R is the phenyl group —compounds of this type being known as amidrazones.

US Rubber Assigned Pesticide Patents

U. S. 2,758,051-4, issued Aug. 7, 1956 to Allen E. Smith, George E. O'Brien and Adelaide Bornmann, and assigned to United States Rubber Co., describe the use of benzoyl phenyl hydrazines in controlling fungi and plants and seeds.

U. S. 2,758,051 discloses the use of substituted 1-benzoyl-2-phenyl-hydrazine (a hydroxy, carboxy, alkoxy, nitro or alkyl substitutent being in position ortho to the carbonyl group).

U. S. 2,758,052 discloses the use of 1-benzoyl-2-(4-chlorophenyl) hydrazine.

U. S. 2,758,053 discloses the use of 1-benzoyl-2-phenylhydrazine, 1-(2-chlorobenzoyl)-2-phenylhydrazine and 1-(2,4-dichlorobenzoyl)-2-phenyldrazine.

U. S. 2,758,054 discloses the use of substituted 1-benzoyl-2-phenyl hydrazines having more than one substituent, at least one of which is in the benzoyl group and consists of halo, nitro, hydroxy, carboxy, alkoxy or alkyl radical—and at least one substituent being in the phenyl group consisting of a halo, nitro or alkyl radical.

New TVA Process

TVA reports it has developed a process for greatly shortening the time to produce superphosphate suitable for immediate use in mixed fertilizers. In a pilot plant at Wilson Dam, Ala., material has been produced for immediate use in mixed fertilizers in 60 minutes and final mixed fertilizer has been made in 90 minutes.

Finer phosphate rock and more acid is used in the process, which TVA says is ready for industry use. Some plants already have part of the necessary equipment and would find conversion a fairly simple matter, according to TVA. ▲

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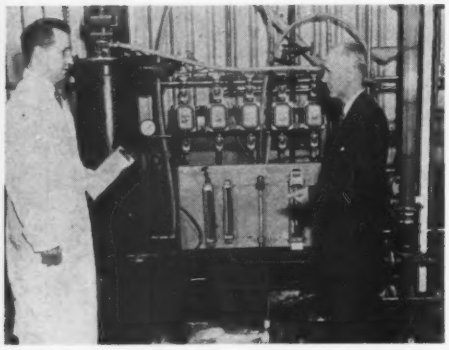
Chemicals

Shulton Produces Sesoxane Synergist

Sesoxane, a new synergist for pyrethrins and related insecticides, is now being manufactured in pilot plant quantities by Shulton's Fine Chemicals Div. of Clifton, N. J.



Shulton's Drs. Hardwicke and Parker with part of the pilot equipment.

The chemical was discovered by Dr. Morton Beroza of the USDA in Beltsville, Md., and reported by him as the 2-(2-ethoxyethoxy) ethyl 3,4-methylenedioxyphenyl acetal of acetaldehyde.

Shulton says that tests have shown Sesoxane to be superior in synergistic activity to other commercial pyrethrin synergists and, because of its effectiveness, is expected to cost less to use than other available synergist formulations for equal knockdown and kill.

Soluble in kerosene, Freon 11, Freon 12 and other solvents, Sesoxane has a faint, pleasant odor and acute oral toxicity (LD_{50}) of 2,000 milligrams per kilogram in rats.

TBA Controls Wild Garlic, Bromegrasses

Almost perfect control over weed bromegrasses and wild garlic, with little or no injury to desirable grasses in forage stands, has been obtained in experimental tests with TBA (2,3,6-trichlorobenzoic acid), say USDA agronomists.

In spray treatments of four to eight pounds per acre during early March, TBA gave excellent control over bromegrasses and did little damage to Kentucky bluegrass in the test plots, although the eight-pound rate did slow it down some.

Applied at two to four pounds per acre in both fall and spring as repeated treatments, TBA completely eliminated wild garlic. The researchers pointed out that further studies are necessary before definite recommendations can be made for its use.

Moly for Melons

Impovement in Ambrosia melon quality, size, color and taste, plus a boost in yield is attributed by Louis Promos of Leesburg, Va., to treatment of vines with sodium molybdate, reports Climax Molybdenum Co. Moly treated plant is at left, untreated on right.

A water solution of sodium molybdate—one ounce to the gallon—was sprayed around hills and vines. With application of about six ounces of chemical/acre, response was noted within 48 hours.

Test Plots Show Ferts. Revive Worn out Soils

A plot of land planted to corn ever since 1876 which received no plant food treatment until 1955, produced 113 bushels per acre this year. This high yield was made on one of the Univ. of Illinois Morrow plots, oldest soil experiment plots in America.

The yields show that low harvests caused by continuous cropping of corn were due to loss of nutrients and not to changes in physical conditions of the soil, said M. B. Russell, head of the university's Agronomy Dept.

Four different treatments were used this year:

1. Continuous corn plot with no treatment since 1876 yielded 29 bushels per acre.

2. Continuous corn plot with manure-lime-phosphate treatment since 1904 yielded 96 bu./acre.

3. Continuous corn plot with no treatment until 1955, then treated in 1955 and 1956 with lime, N, P_2O_5 and K_2O yielded 113 bu./acre.

4. Continuous corn with manure-lime-phosphate treatment, plus extra N, P_2O_5 and K_2O in 1955 and 1956. Yield: 128 bu./acre.

The startling recovery of yields made on the Morrow plots can't be expected on all kinds of soils, say the Illinois agronomists. A soil with good natural physical qualities such as found in central Illinois can be expected to recover similarly, but there are many worn out soils in the state that can't be rejuvenated with heavy fertilizer applications as was done on the test plots.

A. L. Lang and L. B. Miller, members of the committee in charge of the Morrow plots, do some careful piling to get all the corn from the top treated plot into the basket.

Presented in cooperation with the Economic Insect Survey Section, Plant Pest Control Branch, Agricultural Research Service, USDA.

Pink Bollworm Survey

SURVEYS conducted this fall to determine the presence of the pink bollworm show that this serious pest of cotton is still confined to the regulated areas of Louisiana, Arkansas, Oklahoma, Texas, New Mexico and Arizona.

Gin trash, green boll, cotton lint cleaner and gin stand inspections through November 30 show the only new counties reporting pink bollworm to be Crawford, Columbia and Sebastian, Arkansas. All of these counties are in the previously established regulatory zone.

In the Southeastern states of Alabama, Mississippi, South Carolina and Tennessee, 3,393 bushels of gin trash were examined with negative results. Gin trash examination has also been completed without finding pink bollworm in Missouri. A total of 348 bushels of trash was examined in six southern counties. No pink bollworms were found in the 18,124 bushels of gin trash examined during the survey in the San Joaquin valley of California, which ended November 22.

Field inspections of 2,231 green bolls from 2,088 acres of cotton in the southern area of Nevada during the week of October 7 showed no pink bollworm infestation.

During the past season the pink bollworm developed heavy infestations in irrigated cotton along the Brazos area in Texas, in parts of the El Paso Valley area and in untreated fields of Dona Ana county, New Mexico. Populations in the western third of Oklahoma averaged lower than in 1955, while populations in the central and eastern portions of the state were slightly above normal. Light damage was reported from San Simon, Bowie and Elfrida in Cochise county, Arizona.

Weevil Hibernation Counts in Miss.

Woods trash examination to determine the number of boll weevils going into hibernation has been completed in Mississippi.

This fall the state was divided into four areas; namely, the lower delta (Sharkey, Issaquena, Yazoo and Humphreys counties), central delta (Washington, Bolivar, Sunflower and Leflore counties), North Delta (Coahoma, Tunica, Quitman and Panola counties) and the hill section (Amite, Madison, Noxubee and Monroe counties).

Ninety samples consisting of two yards of surface trash each were collected from each area with the average number of hibernating weevils found per acre being 2379, 1814, 2516 and 1655, respectively.

The state average was 2091 compared with an average of 5054 per acre in the fall of 1955.

Soybean Cyst Nematode in Tenn.

The soybean cyst nematode (*Heterodera glycines*), which heretofore in this country has only been known to be in a limited area of North Carolina, was reported from Tennessee the latter part of November.

A recent announcement from Mr. H. L. Bruer, Director of Entomology and Plant Pathology, Tennessee Department of Agriculture, stated that the soybean cyst nematode had been found in Lake county, and at the time of the announcement infested land had been found for approximately two miles south of the original find.

The soybean cyst nematode, which is known to occur in Japan and China, was first found in the Castle Hayne area of New Hanover country, North Carolina. At the present time infestations are known to be on about 1,600 acres in New Hanover and Pender counties, North Carolina.

The North Carolina State Department of Agriculture regulates the movement of articles that might carry the pest from infested fields.

Cooperative surveys between the Plant Pest Control Branch, Agricultural Research Service, and the Departments of Agriculture of Tennessee and North Carolina continue. Cooperative surveys are being initiated in soybean growing states in the vicinity of Tennessee.

Aphids Active On Alfalfa

Among the cereal and forage insects, perhaps the two most active pests during October and November 1956 were the pea aphid and spotted alfalfa aphid.

The pea aphid which had been rather active throughout the 1956 growing season continued to cause concern during the latter months of the year.

In Colorado it was determined that the pea aphid was probably the number one pest of the year.

High populations in combination with the spotted alfalfa and other aphids were present in late October on alfalfa in the northeastern section of the state with heavy damage and large deposits of honeydew resulting.

In Utah the pea aphid often in combination with the spotted alfalfa aphid was heavy on succulent alfalfa in late October and survived the early November cold weather which included snow, frost and freezing temperatures. Population in the western area of Nebraska continued high into early November.

In the central area of Illinois populations of 500–1,000 per sweep were common and individual alfalfa plants in many fields were killed.

During mid-November populations in alfalfa fields of Frederick county, Maryland, still averaged 3–12 aphids per sweep.

The spotted alfalfa aphid continued its spread and damage into the latter months of 1956. Although, in general, populations in Oklahoma continued rather light, counts were up in scattered fields of the central part of the state where green growth was present. Counts in late November as high as 14,500 aphids per square foot of crown were recorded in Oklahoma county.

Med. Fruit Fly Program Status

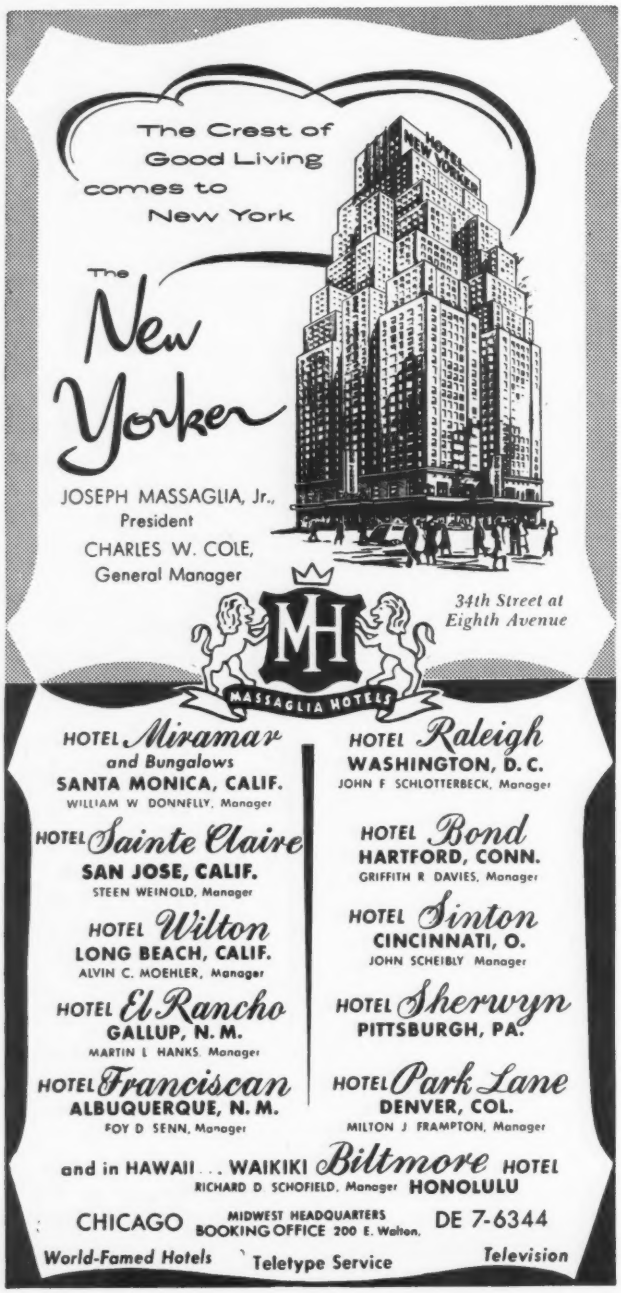
The December 1 report on the status of the Mediterranean fruit fly eradication and regulatory program continues to be encouraging. The insect has been found in 28 Florida counties with an estimated acreage of over 764,000 being involved.

Since initiation of the program in May more than 5,500,000 acres have been treated with a bait spray. Granular insecticides have been applied to over 28,000 acres. As of December 1, 1956, there was known to be approximately 106,000 acres which would require additional bait spray treatment.

Of the 28 counties which had been involved, eight counties have been released from the spraying program and citrus no longer requires fumigation or a certificate for movement. Such restriction is not lifted unless it has been at least 90 days since the last specimen of the fly was collected.

Not included in the above eight is Palm Beach county which was due to be placed in the free category December 11.

As of December 1 spraying had been discontinued in six counties but fumigation and certification requirements still held. Spraying, fumigation and certification was still in effect in the remaining 14 counties. ▲



Statistics

Consumption, Output Of Ferts. in Spain

In Spain, consumption of plant foods during the fertilizer year 1954–55 is reported to have increased about 12 per cent over that in the preceding year, totaling 144,000 metric tons N, 235 tons P_2O_5 and 58,000 tons K_2O.

In a recent speech, the Minister of Commerce said that output of nitrogenous fertilizers was 220,000 tons in 1955. Phosphatic fertilizer production totaled 1,456,000 and imports of phosphate rock from July 1954 to June 1955 amounted to 698,833 tons.

Although Spanish production of nitrogenous materials has climbed considerably in recent years, it still must import about 70 per cent of its requirements. Potential market for U. S. nitrogenous fertilizers, especially ammonium sulfate, has been estimated at 100,000 to 200,000 tons annually, depending on how competitive prices are with those of European producers.

Plant Food Use In Wisc. Reported

Fertilizer consumption in Wisconsin during 1955–56 totaled 411,792 tons, according to reports by firms licensed to sell plant foods in the state.

Thirty-six per cent of fertilizer users chose 5-20-20; 23 per cent bought 3-12-12; 17 per cent, 4-16-16 and 10 per cent, 10-10-10.

Calif. Mixed Fert. Sales Show Increase

Sales of dry mixed commercial fertilizers in California during the quarter ended Sept. 30 rose 5,563 tons over the corresponding 1955 period, reaching 43,350 tons.

An increase also was reported in sales of liquid mixed fertilizers. Totaling 10,559 tons in 1955, sales of the liquid plant foods in California increased to 11,198 tons in 1956.

Largest tonnage sold was of 10-10-5, 6,687 tons, followed by 10-10-10 with 4,492 tons and 17-17-0, 3,707 tons.

Copper Sulfate, Super Shipments Up

Shipments of superphosphate and other phosphatic fertilizers during September totaled 126,630 tons, an increase of 29 per cent over the previous month's volume. At the end of September, stocks on hand were 3 per cent less than those held on August 31.

Shipments of copper sulfate in October gained 17 per cent over September and stocks on October 31 were little changed from inventories at the beginning of the month, the Bureau of Mines reports.

Production — September, 1956

Compiled from Government Sources

Chemical	Unit	September 1956	September 1955	August 1956
Ammonia, synth. anhydrous	s. tons	257,014	231,954	242,584
Ammonia liquor, coal & coke (NH_3 content) (Including diamm. phosphate & ammon. thio.)	pounds	2,972,607	2,941,500	2,637,706
Ammonium nitrate, fert. grade (100% NH_4NO_3)	s. tons	138,086[1]	119,961	139,635
Ammonium sulfate				
synthetic (technical)	s. tons	93,462	77,133	81,576
coke-oven by-prod.	pounds	151,824,822	164,930,100	126,525,694
BHC (Hexachlorocyclohexane)	pounds	6,164,005	6,492,307	7,682,872
Gamma content	pounds	1,040,016	1,071,258	1,322,010
Copper sulfate (gross)	s. tons	4,792	6,832	5,964
DDT	pounds	11,911,632	10,190,027	12,137,578
2,4-D Acid	pounds	2,317,615	2,963,325	1,447,560
esters and salts	pounds	1,609,714	1,660,774	625,659
esters and salts (acid equiv).	pounds	1,141,828	1,315,979	459,730
Lead Arsenic (acid and basic)	s. tons	[2]	[2]	[2]
Phosphoric acid (50% H_3PO_4)	s. tons	289,570	318,254	*263,647
Sulfur, Native (Frasch)	l. tons	524,370	498,591	597,699
Recovered	l. tons	42,000	30,800	42,500
Sulfuric acid, gross (100% H_2SO_4)	s. tons	1,272,072	1,259,314	1,181,809
Superphosphate (100% APA)	s. tons	170,557	182,209	143,146
Normal (100% APA)	s. tons	98,278	121,223	88,073
Enriched (100% APA)	s. tons	[2]	3,179	[2]
Concentrated (100% APA)	s. tons	57,170	57,379	40,825
Wet Base (100% APA)	s. tons	[2]	428	[2]
Other phos. fertilizers	s. tons	13,929	14,316	13,142
2,4,5-T Acid	pounds	410,283	86,789	253,758
Urea	pounds	67,434,480	—	62,525,520
Calcium Arsenate	s. tons	[2]	[2]	1,171

* Revised. [1] Includes quantities for 1 plant previously not reporting. [2] Withheld to avoid disclosing figures for individual establishments.

Fertilizer Materials Market

New York

December 20, 1956

Sulfate of Ammonia. Several large export shipments have been reported recently, but stocks are still large at most production points and no price changes were noted. Additional inquiries are in the market for export.

Ammonium Nitrate. Producers are hoping for an increase in shipments after January 1, as most buyers enter the heavy fertilizer shipping season. Stocks are ample at most production points.

Urea. Shipments continue to arrive from Europe but only in a limited way. Domestic material is moving under contract with the chemical trade taking most of the material at present.

Nitrogenous Tankage. Movement of this material, while picking up some in the last thirty days, is still behind last year as buyers hesitate to stock up. Prices are still $3 to $4 per unit of ammonia ($3.64 to $4.86 per unit N), f.o.b. shipping points.

Castor Pomace. Offerings of this material are not available at the present time because of plant shutdowns and shortage of castor beans. The market is nominally $40 per ton, f.o.b. production points with no offerings.

Organics. Trading was slow in organic fertilizer materials as most buyers preferred to wait until they actually need materials. Tankage and blood last sold at about $5 per unit of ammonia ($6.08 per unit N), f.o.b. Eastern shipping points. Soybean meal was steady around $46 per ton, f.o.b. Decatur, Ill., with little interest being shown by buyers. Cottonseed meal was pretty well sold ahead and offerings were not too plentiful. Linseed meal was firm with most of the buying coming from the feed trade.

Fish Meal. This material is having its usual post-season advance in price with last sales made on the basis of $140 per ton, f.o.b. fish factories with some offerings held higher. Little foreign fish meal was being offered at present and most of the Northern fish factories have shut down for the season.

Bone Meal. Last sales were made at $60, f.o.b. shipping points and some imported feeding bone meal is being held at $65 per ton. Demand is fair at the present time for immediate shipment.

Hoof Meal. This market is featureless at the present time with last sales made on the basis of $5.75 per unit of ammonia ($6.99 per unit N), f.o.b. Chicago. Demand is slow from the fertilizer trade.

Superphosphate. Mixers are taking deliveries as needed and the supply is ample in most sections. Triple was reported moving a little better than sixty days ago. The production of triple superphosphate has been increased recently because of the completion of several new plants.

Potash. Routine shipments are taking place against existing contracts and while movement was reported fair in the far South, shipments to other sections were rather scattered.

Philadelphia

December 20, 1956

Production of raw fertilizer materials continues fairly active, with movement slightly improved, although still not too active. Tankage is weaker, and castor pomace is practically unobtainable. Prices of ammonium nitrate, anhydrous ammonia and nitrogen solutions are scheduled for advance January 1.

Sulfate of Ammonia. Stocks continue to increase and are said now to be the greatest volume ever. Movement is said, however, to be picking up.

Ammonium Nitrate. Supply continues in great abundance, with movement fair. Price is listed for advance of $1 per ton Jan. 1.

Nitrate of Soda. No change in price is reported, and stocks are ample to meet all requirements.

Blood, Tankage, Bone. Market is very quiet with movement rather slight. Tankage dropped 25 cents per unit in New York area during the past week. Quotations at this time show blood at $5.25 per unit of ammonia ($6.38 per unit N), in the New York area, and $5 ($6.08 per unit N), Chicago. Tankage is offered at $4.50 per unit ($5.47 per unit N), New York area and $5.25 ($6.38 per unit N), Chicago. Bone meal remains rather dormant at $60 per ton.

Castor Pomace. This is now practically unobtainable in any reasonable quantity. Demand is good.

Fish Scrap. Supply is rather limited and demand is slow. Market remains at about $136 to $138 per ton for unground scrap, and $140 to $142 per ton for menhaden meal.

Superphosphate. Stocks continue large and movement not too brisk. Market remains at 88 to 91 cents per unit APA per ton.

Potash. Movement quiet and stocks continue large, but recent export business has helped to relieve inventories a bit. ▲

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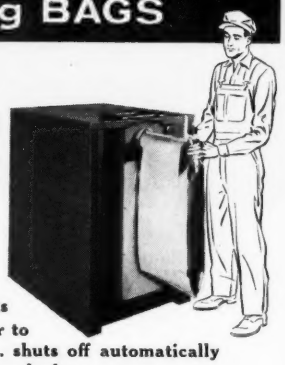

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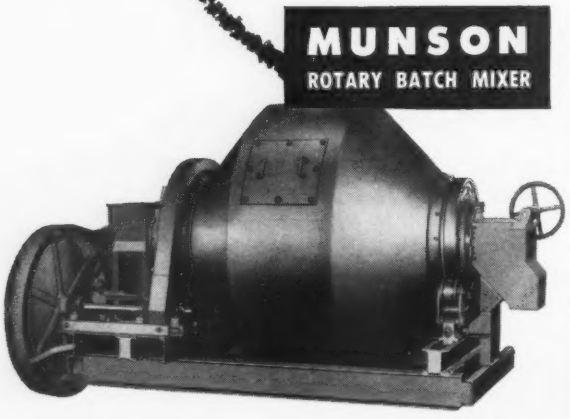

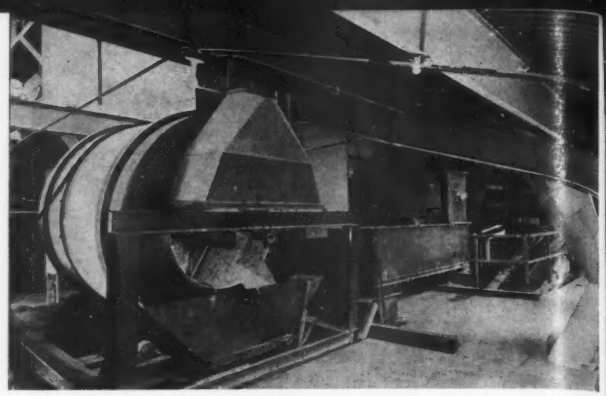

View showing TVA type and ribbon type continous ammoniators side by side.

Ribbon Ammoniators

WITH the fertilizer industry producing a larger and larger tonnage of granular fertilizer each year, requirements for manufacturing facilities have also increased accordingly. The TVA type continuous ammoniator has gained in acceptance, and recently ribbon type continuous ammoniators have been introduced to ease these production problems.

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editorial

IN A year end synopsis of pesticide sales, the National Agricultural Chemicals Association reported sales hit an all time high of $250,000,000 at the basic producer level. This is a 25 per cent gain over 1955 sales. Basis for the increase can be found in the expansion of four major areas during the year, (1) farm markets, where more and more chemicals are applied by farmers to reduce unit costs of production; (2) home consumer market, where increasing numbers of suburbanites are using pesticides for improvement of gardens and lawns; (3) increased usage of insecticides in public health programs on a world wide basis; (4) application of chemicals for the control of vegetation along roadsides.

An indication of the steady sales growth during the year can be illustrated by figures for the past 11 months of 1956: Benzene hexachloride (gamma basis) up 66 per cent; DDT up 25 per cent; 2,4,5-T up 74 per cent and copper sulfate up 4 per cent. Chemicals not reported by the United States Tariff Commission were in evidence of increased sales with reports coming in from Stauffer and Shell Chemical telling of satisfactory gains over the previous year.

As for calcium arsenate's record, it is reported that sales were greater in 1956 than in 1955, and that forecasts indicate 1957 will be even greater than in 1956. New applications for this insecticide are being found by combining it with organic or phosphate compounds. Cooperative research programs are currently underway exploring organic arsenicals as well as development of a compound with characteristics of calcium arsenate, but which can be applied in liquid form. Satisfactory results from such efforts should all go to enhance the future market of this chemical.

As for the profit and sales picture at formulator-distributor level, things were not quite as rosy, with supply greater than demand, and carry-over inventories being sold at distress prices, with little margin. Many firms in this position were second guessing as to the future. From present indications inventory of finished formulations will continue to be a problem.

During the past year continued complications appeared on the scene to help cloud optimistic sales goals—lack of farmer education, severe price competition throughout levels of distribution and the growing problem of insect resistance. All this, plus the Miller Bill, helped to discourage industry members, and curtail maximum sales.

Under the strain of price competition many inefficient and marginal producers are seeking other fields of endeavor. Consignment persists in offering continued harassment to those engaged in it.

Due to the critical international situation, expenditures by foreign governments may be reduced because of the dollar gap brought about by the Suez situation, which may effectively reduce budgets in health and agricultural programs.

With all of the past recorded and taken into consideration the future appears very bright. Research is continually introducing new systemic chemicals which are gaining in grower acceptance. Expenditures for chemical usage on the Federal highway program should begin to be felt in the marketplace this year, and its continued effects should be realized when maintenance problems appear after initial efforts are met.

Continued peak sales and production are slated to carry over into mid-1957. However, on the basis of increased competition, and higher cost of sales, margins should be squeezed still further.

Effects of the Miller Bill will cause presently used pesticides to have extended lives. Because of the expensive and painstaking research required before marketing, the numbers of newer chemicals arriving on the market will be fewer than those which made their entry directly after the war.

AS FOR the fertilizer industry, uptrends and optimism are not as common as found in the pesticide field. Latest recorded information available estimated that a total of 19,980,264 tons of fertilizer were consumed in the year ended June 30, 1956. When compared to 1955, the tonnage is down a little less than one million, or a decrease, percentage wise, of 4.41. However, with tonnage down, estimates indicate consumption of primary nutrients was greater than the previous record period of 1954–55.

Breaking the totals down by regions, the greatest decrease occurred in the west north central states, a drop of 12.71 per cent, with Nebraska having the greatest decline, 38.34 per cent. Western states recorded a gain of 0.25 per cent. Nevada turned in the greatest percentage gain, 71.62 per cent.

With the spring season fast approaching, many conflicting opinions are heard in regard to what sort of year it will be. Some claim that with reduced acreage farmers tend to increase fertilizer amounts on the remaining acres, and it is the feeling of the National Plant Food Institute that gains will more than offset any losses due to the Soil Bank program. This excludes land in the Acreage Reserve plan, which very well may find fertilizer application.

In summarizing, the possibility of a resultant 0.5 per cent increase in fertilizer consumption is feasible. Additional effects of the program could result in severe changes in certain localities and could effect individual plants seriously. Crop practices could very well be changed from the Banks' effects and, consequently, long term readjustments would be established in certain sections in so far as the kinds and types of plant food required.

W. P. S., *Editor*

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Tractomotive Corp., Deerfield, Ill.

MACHINERY—Mixing and Blending
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Munson Mill Mach. Co., Utica, N. Y.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Mixing, Screening and Bagging
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Power Transmission
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Superphosphate Manufacturing
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MALATHION
American Cyanamid Co., New York City

MAGNESIUM SULFATE
Berkshire Chemicals, New York City

MANGANESE SULFATE
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, Washington, D. C.

METHOXYCHLOR
Geigy Agr. Chems., Div. Geigy Chem. Corp. N.Y.C.

MINOR ELEMENTS
Geigy Agr. Chems., Div. Geigy Chem. Corp., N.Y.C.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Munson Mill Mach. Co., Utica, N. Y.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

NITRATE OF POTASH
Berkshire Chemicals, New York City

NITRATE OF SODA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
McIver & Son, Alex. M., Charleston, S. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Escambia Chem. Corp., Pensacola, Fla.
Lion Oil Company, El Dorado, Ark.
Mississippi River Chem. Co., St. Louis, Mo.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Sinclair Chemicals, Hammond, Ind.
Sohio Chemical Co., Lima, O.

NITROGEN MATERIALS—Organic
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Sons, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

PARATHION
American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Monsanto Chem. Co., St. Louis, Mo.

PHOSPHATE ROCK
American Cyanamid Co., New York City
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID
American Agricultural Chemical Co., N. Y. C.

PLANT CONSTRUCTION—Fertilizer and Acid
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston Mass.

POTASH—Muriate
American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
Bradley & Baker, N. Y. C.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
National Potash Co., N. Y. C.
Potash Co. of America, Washington, D. C.
Southwest Potash Corp., New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate
American Potash & Chemical Corp., Los Angeles, California
International Min. & Chem. Corp., Chicago, Ill.
Potash Co. of America, Washington, D. C.

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

REPAIR PARTS AND CASTINGS
Stedman Foundry and Machine Co., Aurora, Ind.

SCALES—Including Automatic Baggers
Exact Weight Scale Co., Columbus, O.
Stedman Foundry and Machine Co., Aurora, Ind.

SCREENS
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

SHOVEL LOADERS
Clark Equipt. Co., Benton Harbor, Mich.
Hough, The Frank G. Co., Libertyville, Ill.
Tractomotive Corp., Deerfield, Ill.

SOILTEST EQUIPMENT
The Edwards Laboratory, Norwalk, O.

SPRAYERS
Finco, Inc., N. Aurora, Ill.

SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.
Baughman Mfg. Co., Jerseyville, Ill.

SPREADERS, TRUCK
Baughman Manufacturing Co., Jerseyville, Ill.
Highway Equipment Co., Cedar Rapids, Ia.

STORAGE TANKS
Cole, R. D., Manufacturing Co., Newnan, Ga.

SULFATE OF AMMONIA
American Cyanamid Co., New York City
American Agricultural Chemcal Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Phillips Chemical Co., Bartlesville, Okla.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TANKS—NH3 and Liquid N
Cole, R. D., Manufacturing Co., Newnan, Ga.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.

TRUCKS—SPREADER
Baughman Mfg. Co., Jerseyville, Ill.
Highway Equipment Co., Cedar Rapids, Ia.

UREA & UREA PRODUCTS
Atkins, Kroll & Co., San Francisco, Calif.
Bradley & Baker, N. Y. C.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Nitrogen Div. Allied Chemical & Dye Corp., N.Y.C.
Sohio Chemical Co., Lima, O.

UREA-FORM
Nitro-Form Agricultural Chemicals, Woonsocket, R. I.

VALVES
Monarch Mfg. Works, Inc., Philadelphia, Pa.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.

To all our friends, Happy New Year!

May your hearths burn bright and your
loads be light.
Your cup brimful with cheer.
And may all go right, without
drought or blight
Throughout the coming year.

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